EDUCATIONAL MONOGRAPHS

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UNIVERSITY OF BIRMINGHAM
INSTITUTE OF EDUCATION

IV

J. E. COLLINS

THE EFFECTS OF REMEDIAL EDUCATION

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UNIVERSITY OF BIRMINGHAM, INSTITUTE OF EDUCATION

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No. 4

THE EFFECTS OF REMEDIAL EDUCATION

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EDITORIAL NOTE

OBJECTIVE evaluation of any form of therapy is notoriously difficult. Comparison of the effects of different techniques is frustrated by inadequacy of experimental controls, and by uncertain definition of the criteria of success. Follow-up after close of treatment is seldom sufficiently thorough to provide any estimate of the permanence of the effects. Dr Collins has attempted to overcome these difficulties: his rigorously objective experiment, and his extensive critical survey of the literature will be valuable to all concerned with remedial education. Not all will welcome his conclusions. Those who know the value of the remedial services established by progressive local authorities will not be tempted to the hasty conclusion that the work of these services is here discredited, but the obligation to reconsider the nature of remedial education, and the terms in which its results are stated, is inescapable.

E. A. PEEL

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J. E. COLLINS

PART I

PREVIOUS RESEARCH

CHAPTER 1

THE BASIC CONCEPTS

THIS monograph is an attempt to meet the needs of research workers, students, educational advisors and practising teachers by a study of the effects of remedial education. The concept of retardation is discussed, efforts to remedy retardation are described and related research is reviewed. Then follows a description of an experiment at the Institute of Education of the University of Birmingham, unique in its inclusion of adequate experimental design and follow-up studies to assess the permanence of the immediate test results. The conclusions stress the impermanence of the gains linked with remedial teaching and, therefore, the need to reconsider the place of remedial education.

A. THE CONCEPT OF RETARDATION

The terms *educational backwardness* and *educational retardation* are chiefly used to describe slow progress in reading, spelling and arithmetic. They are not synonymous and the states they define have been clearly identified by Kellmer Pringle (1956, *Times Ed. Supp.*).

TABLE I

CATEGORIES OF BACKWARD AND RETARDED CHILDREN

	Chronological age (years)	*Mental age (years)*	*Educational age (years)*
Backwardness (irremediable)	10	8	8
Retardation (remediable)	10	12	10
Backwardness and Retardation (both remediable)	10	12	8
Backwardness and Retardation (latter only remediable)	10	8	6

It will be seen that backwardness and retardation are conventionally related to age norms. The categories are based upon the assumptions that life-age indicates maturity, and tests measure true educational capacity and innate mental ability. A *backward* child works below his chronological age while a *retarded* child works below his mental age. A child can be both backward and retarded. The denotations of these words are most important for the term *backwardness* is sometimes used to describe retardation. Thus in Cheshire the Committee (1956) stated that 'a child may be said to be backward if his standard of attainment is lower than his level of intelligence would justify'. In practice the assessment of retardation by the comparison of mental test scores has led to the identification of specific educational disabilities by the discrepancies between mental and attainment ages and the use of achievement quotients (A.Q.s) to measure learning efficiency. This may be illustrated by three examples. Schonell (1942) defined retardation by the statement that '. . . a pupil is specifically backward and needs special help when his ability in a subject or allied subjects is at least 1½ years below his other educational attainments and at the same time below his level of general intelligence'. The replies to an inquiry (Collins, 1953) included the following statement from Kent:

> The front of the (Kent) record card has been designed so as to give two essential facts about a child throughout his career in the primary school, viz. his inborn general intelligence and the use which he makes of this in learning the fundamental subjects. . . . It is instructive to compare a child's attainment quotients with his intelligence quotient. By taking the intelligence quotient as the basic measurement it is easy to see whether the child is progressing as well as can be expected in the subjects being tested. If the average of a child's attainment quotients, i.e. his E.R. (Educational Ratio), is roughly equal to his intelligence quotient, his teacher can be satisfied that the child is making use of his gifts even though the child may be far below average in attainment. A glance at a child's attainment quotients will show in which subjects he is in advance of what might reasonably be expected, viz. those subjects in which his attainment quotient is greater than his intelligence quotient.

The Cheshire Education Authority has written that 'in terms of quotient a child should be considered sufficiently backward to justify remedial treatment if his intelligence quotient exceeds his English or Arithmetic quotient by 10 points'. This practice is still followed in the United States. Altus (1956) diagnosed elementary school children with severe reading disabilities and this state was defined as 'a discrepancy of two years or more between a given child's expected reading level as derived from his Full Scale WISC I.Q. and his actual reading level as measured by a standardised reading test'.

Measures of retardation in the school subjects are, therefore, statistical comments on individual children derived from test scores. Retarded children are discovered by testing groups thought by their teachers to be retarded. This is the screening test survey technique recommended by Schonell (1942) and figures based upon such surveys have led to estimates of the incidence of retardation. The procedure has been fully described by Fieldhouse (1957).

B. THE INCIDENCE OF RETARDATION

Estimates of the number of children needing help with individual basic subjects are frequently met with. Intelligence tests (usually non-verbal) are applied simultaneously with attainment tests. The individual score discrepancies are then computed and all children with educational scores significantly below their mental test scores are noted as retarded. This material has been summarised by Kellmer Pringle (1956) and M. D. Vernon (1957).

TABLE II

INCIDENCE OF RETARDATION

Midland town	*Date*	*Age group (years)*	*Percentage frequency*	*Criterion (years below mental age)*
1	1949	9–11	20	2
2	1951	—	11	1½
3	1952	7–8	11	2
4	1953	9–10	8·5	2
5	1955	8–9	15	2
6	1955	7–8	19	1½
7	1955	8–9	23	1½
8	1956	8–9	22	1½
9	1956	7–8	15	1½

It is a disadvantage that the numbers of children are not stated, that many are young children whose retardation may be more relative than real, that different tests have been used and that the criteria of retardation vary. It is also a serious omission that the percentages of advancement and of children making normal progress are not given. The relatively normal distributions of advancement and retardation obtained by the investigator in another Midland area (see p. 48) suggest that the percentage frequencies in Table II are to some degree statistical artefacts. Recent material published by the National Foundation for Educational Research also bears upon this and will be discussed together with the A.Q. in Part III of this monograph.

The true amount of 'remediable retardation' is probably unknown. Many young children who are labelled retarded are probably showing the developmental lag which Schonell particularly mentioned when explaining that 15% of 8-year-olds are bound to lag because 'young immature minds need opportunity and time to sort things out, to understand what they are doing, and to see the purpose in the operations with which they are confronted'. Such children, he said, should not be hurried and he pleaded for 'more liberal use of play, rhythmic work and general activity in the junior school'. Estimates of retardation also vary from worker to worker. Harris (1947) suggested that children in American primary grades could be selected for special instruction on such small differences as six months' discrepancy between mental and attainment ages. In Britain, Andrews (1951) called a sample of 34 children retarded when their mean A.Q. was as high as 94. Also the statistical treatments used by different workers, the varying importance attached to general or specific retardation and to weighting chronological age lead to marked variations in the meaning of estimates. Sleight (1932), for example, used a total sample of 739 children selected as 'too dull and backward to keep pace with the average of their schools'. The distribution of I.Q.s in this group was: above average 3·4%, normal 24·3%, dull 58%, and possibly defective 14·3%; so that the *modal* mental category was dullness. When reviewing this material Sleight saw that the ages of the children and the inter-test correlations should be taken into account to avoid inflating the percentages of retardation. When A.Q.s were computed by his formula 68·3% of this dull group was shown to be accelerated or normal in achievement. The amount of apparent retardation was decreased by this use of statistics. Sleight's work took place in 1932. Yet his refinement has not been used in any local education authority survey or by any investigator. Birch (1951), for example, asserted that 40% of 11+ children were retarded by two years in reading but this estimate is based upon uncorrected mental and reading test discrepancies. It does seem that the earlier investigators were more discerning. Schonell (1942) discovered only 3·9% of retardation in reading, 4·0% in spelling and 4·8% in written English. His comments appear to have been missed by the investigators responsible for the alarming figures quoted by L.E.A.s. He said:

> Most of these estimates are, in general, lower than those popularly given, and the results suggest that not infrequently what parents and teachers consider is marked disparity in intelligent pupils between scholastic achievement in particular subjects and intellectual capacity, is not really so pronounced when judged by consistent objective standards. The figures indicate the need in certain cases, particularly among brighter pupils, for less anxiety and tension, from both teachers and parents, if children happen to be a little below normal in one or two subjects. Such deficiencies are often natural variations compensated for in many instances by achievements slightly above normal in other subjects, particularly arithmetic, art or handwork.

Thus there are no reliable estimates of *retardation* available, for true retardation has not been distinguished from the variations between rates of growth of boys and girls or the individual patterns of development shown by all children.

C. CAUSATION

The search for causes of slow learning stems from the identification of retarded children and the attempts to estimate their frequency in the schools. Burt (1950) was one of the pioneer investigators and his discovery of some 30 cases of specific retardation in the group that he studied led to a series of researches. Hume (1926), Wheeler (1927), Adams (1940) and Schonell (1942) used tests and case studies to probe causes, which were then grouped into physical, emotional and social, educational and certain specific factors, for example, 'word-blindness'. The investigators paid special attention to specific factors, particularly those connected with sense perception. There was, however, little precision about the work so that there has been a long history of

March hares and false trails. Recently reported Swedish work by Malmquist (in *Educational Research*, 1958) disposes of the notion of 'word-blindness' by showing that differences between poor and good readers are of a quantitative rather than a qualitative nature, and indicates that the concept of specific reading disability is itself unfounded. It was shown that reading disabilities at first-grade level are never isolated effects, for failing pupils deviate from the mean of the normal population in many factors in addition to reading. Work to be reported by the investigator also confirms Malmquist's opinions.

It does seem that past work is a history of research in which the relationship between each factor and retardation has been a *guess* rather than a fact of science. Even the chief investigator, Schonell, failed to use a control group so that his insights into the growth of children are swamped by loose notions of causation and the prominence given to mental age. Schonell also centres his discussion on the treatment of symptoms by teaching methods rather than on physical, social and emotional conditions affecting slow learners. Unfortunately, inadequate educational stimulation has held back many children. There are slum schools even to-day. Gates (1935) said that 'remedial teaching was no more than good first teaching'. Bad teaching environments and inadequate educational stimulation are, therefore, important causes of school failure.

The pursuit of isolated factors still influences present attitudes to diagnosis and causation. Thus M. D. Vernon (1957) discusses 'left-handedness' and 'congenital disability', although Spache (1953) drew attention to the need to explore the personalities of retarded readers as a whole. Spache has expressed the current American opinions on the physical, mental, emotional and environmental origins of school failure. Americans believe that the part played by some physical factors has been exaggerated because of their constant citation as single causes of slow learning. Thus many explanations of visual functioning in reading have been found to be contradictory and unconvincing. It is now understood that auditory and visual memory spans, cerebral dominance, preference for right or left hands and eyes and poor motor coordination are not fundamentals but symptoms as, for example, deafness is a symptom in a syndrome or group of symptoms. They are linked with deeper conditions of health, nutrition, integration of the nervous system or with the effects of intelligence and the extent of training or experience with specific kinds of symbols. These deeper conditions interfere with the expression of personality and thrust normal growth aside by 'producing conditions of intellectual retardation, lowered vitality and delayed physical maturation which will affect all academic progress'. Spache pointed out that such conditions were not causal *per se* for they could be found among successful pupils. For example, Clarke (1957) says that left-handedness has no significant link with retardation. 'In conclusion it is worth pointing out that no essential difference was apparent between left-handers and right-handers, except for their use of a different hand.'

New trends of thought are also noticeable when mental factors are considered. Measures of intelligence are to-day recognised as impure and subject to personality and environmental influences. Mental age may not register the level of a child's understanding. Betts (1956) has stated that 'the relationship between mental age and thinking ability is positive but relatively low'. At the moment an analysis of the characteristic patterns of the intelligence of slow learning children may be a fruitful line of inquiry (see p. 86).

The link between slow learning and personality is hazy. Malmquist has shown that some personality traits differentiate good from poor readers. The latter tend to have less self-confidence, less persistence and concentration, less ability to make contacts, and to be less stable and more inclined to submit to the leadership of others than are children of good reading ability. Narrow academic aspects of the problem, for example, the question of the relative priority of school failure and maladjustment are being outgrown because the introduction of play therapy and other techniques is opening new fields. It is not unlikely that the present anxiety in the school system about learning may be producing emotional difficulties in deviant groups that are not easily overcome. The road to the prison, the mental hospital and the divorce court passes through the school yard, and a study of the case notes in Birch's thesis (1951) shows that remedial teaching does not mitigate serious personality and behaviour problems.

As mentioned when discussing Schonell, conditions in schools are no doubt responsible for much poor reading and lack of interest in reading. This is certainly so in arithmetic (*Times Ed. Supp.*, 1957). If boys and girls take their first steps under the guidance of teachers with inadequate training, retardation is bound to be a consequence. And if there are schools where 'partly owing to the lack of time given to English and partly because the teachers of the subject are not really interested in reading, some of the literature lessons are a waste of time, and the ignorance of children, even those in A classes at the top of the school, is disquieting' (*Observer*, 1954), then schools must hinder the cultural growth of children. In England Vernon has noted the deterioration of I.Q.s of children selected for secondary modern schools. In America, Spache referred to learning difficulties created by inflexible teaching, and Kottmeyer (1953) said:

> There is not much question that the majority of children who are sent to reading clinics for remedial teaching should and could learn basic reading skills in the classroom. It is easy to understand that, so long as we continue to try to teach children to read who are not ready to read and so long as we merely expose them to increasingly difficult reading material instead of teaching skills we shall have large numbers of children who finally become candidates for clinics or remedial classes.

Birch's (1951) comments in England are quoted elsewhere (see p. 120). He is not alone for Schonell (1942) referred to temperamental clashes between children and teachers, and Conduct and Ward (1955) stated that '. . . research in the past may have been directed too much to the individual and too little to the class. More efficient methods of classroom teaching could considerably improve "productivity" in reading, and probably lessen the number of children who become "problems" in the learning of this basic subject.' Malmquist (1958) has also shown significant relationships between the teacher's age, number of years' service and the pupils' achievements in reading. Huelsman (in Spache, 1953) is another American who has noted the effects of overcrowded, out-of-date schools. Schools where lighting is bad, seats are uncomfortable and heating is poor are bound to affect learning and motivation.

Motivation is also affected by social class attitudes. Schools vary considerably in levels of average attainment. Remmers (1953) has said that the different social class attitudes to education are clear by the ages of nine or ten, while Havighurst (1953) has indicated that social class differences are considerable in the basic subjects. Middle-class adults stimulate their children to higher levels than do lower-class adults whose level is usually reached by their children when the latter reach the age of 11 or 12. Thus attainments vary considerably from district to district, and between types of school. For example, in the survey of reading carried out by the Ministry of Education (1956) the average reading ages of children aged 15 years in secondary grammar, secondary technical and secondary modern schools were approximately 16 years, 15·3 years and 12·6 years. The average for 15-year-olds in all age schools was 12·3 years. The average for children of the same age from all types of schools was 13·3 years in urban areas and 12·3 years in rural areas. Many factors are thus linked with attainment apart from test-measured intelligence.

Investigations of causation have been enriched in recent years by the psychology of child development. This approach to the conditions affecting school work stems from the American researches of Olson and Hughes (in Anderson and Dearborn, 1952). They have stressed growth as the decisive factor in learning by their concept of *organismic age*. This is an average of growth. Olson and Hughes state:

> Theoretically, the measures taken should represent an inclusive theory of the organism. A complete account might include measures of emotionality, social adjustment, gross bodily development, circulation, efficiency of sense organs, development of educational and physical skills, and measures of metabolic function.

Schonell also noted the need to consider the 'periods of physical growth'. This developmental approach to causation appears in Anderson and Dearborn and in Millard (1951). It replaces the discovery of discrete causes by the consideration of each child as a unique and ripening organism. The organismic approach will probably open up new lines of investigation. Werner (Harris, 1957) has suggested that the complexity of development with its overlapping of progression and regression, emergence of structure and function and decrease and final yielding to new forms of growth and activity may lead to the eventual rejection of measured achievement as a true gauge of the developmental stage that a child has reached. The importance of individual differences in rate of growth in attainment is also indirectly emphasised by Malmquist, who made a follow-up study of her original sample of children some years later. Correlations between the results of reading tests given in the first grade and marks obtained by the children in the fourth grade were all above 0·6. Furthermore, with only one exception all pupils designated as poor readers at the beginning of the investigation remained at a level of achievement below the average of that of their school-fellows of the same age in the populations investigated. In remedial education there has been too much attention to retardation, and too little understanding of the implications of individual differences.

CHAPTER 2

THE NATURE OF REMEDIAL METHODS

THE aim of remedial teaching is to give a child the means of developing his unrealised intellectual power so that he may achieve satisfying standards in the basic subjects. Remedial teachers need confidence in themselves, a sympathetic attitude to children, the ability to accept the limitations of pupils, exact knowledge of the teaching materials most useful at the differing age levels, familiarity with a wide range of materials and skill in interpreting and planning the follow-up of test results. Remedial teachers work patiently but persistently to arouse children's interests, to remedy defects and carefully teach habits and skills which have not previously been learned. In the words of Gates, it is 'good first teaching'. Fleming (1952) also has noted this, commenting:

> Remedial methods are in essence the same as the methods adopted in the successful teaching of so-called normal pupils. They differ only in that they are applied with greater flexibility and more discrimination; and there is reason to believe that, where adaptation to individual differences is combined with wise appraisal of the progress of pupils at each stage of learning, remedial or corrective instruction becomes to a large extent unnecessary.

Remedial methods are based upon normal classroom practices, the things a good teacher ought to do. To illustrate: the remedial class makes use of graded books and practical material. These first appeared in infant rooms, were promoted to the junior school and then to the secondary stage. Remedial classes and normal classes have them in common. The good teacher is motivated to help. The remedial teacher is *consciously* benevolent, and prefers praise, patience and tolerance to disapproval and an atmosphere of excessive competition. The first step in good teaching is to find the stage each child has reached. Child study is more systematic in the remedial teaching situation than in the ordinary school for diagnostic tests are used and case histories are made. Sensitive teachers always study children's environmental backgrounds, so that they may help them through the school if necessary. A 9-year-old may write in an essay on 'My Home': 'When I have a home I will have a room. I will have a window. I will put a flower in it.' Her teacher will sense how little she knows of the home from which that child comes. The remedial teacher tries to make easy relations with the home. She is not content with hunches. The home will be visited and knowledge gained of material conditions and emotional atmosphere will be used to help the child. Finally, as in all good teaching, remedial teachers will keep records and repeat tests at regular intervals to check the original diagnosis and progress in response to treatment.

The growth of remedial services to-day is closely bound up with the functions of the School Psychological Service and of Child Guidance. The present impetus stems from the Education Act of 1944. Educational psychologists are called upon to give advice on individual children with learning difficulties or behaviour problems. When case histories of school failure are revealed by investigation it is natural to think of remedial instruction as a therapy. Remedial teachers are, therefore, being appointed on a permanent basis by many authorities because sporadic attempts to help slower children in schools as, for instance, after absence, are less likely to achieve success than *organised* arrangements. The investigator suggested in *Education*, 1952, that such teachers should be attached to School Psychological and Child Guidance Services and this is the present-day trend. Some teachers work in full-time Remedial Centres in separate premises to which children, usually of junior school age, are referred for full-time or half-time treatment. Others work on a peripatetic basis, visiting treatment groups arranged in adjacent schools. Referral to the Centre is usually done through the Child Guidance Clinic. Other teachers are in charge of classes for children whose emotional maladjustments are responsible for retardation and, therefore, need radical treatment of an intensive kind. There are few reports on this work but there is little doubt that remedial help produces results when children have for one reason or another been deprived of normal educational opportunities. Remedial teachers also, because of their extra training, should be helpful in interpreting children and problems to parents and teachers. Remedial methods will now be illustrated by descriptions of methods of teaching in use to-day.

A. READING

Schonell (1942) suggested an eclectic method based upon the pioneer remedial work in the United States. His method formed the basis of instruction at the Remedial Education Centre of the University of Birmingham in 1952. The approach is mixed, combining 'look and say' sentence and phonic work. The child is encouraged to make a start by memorising a short poem. He then 'reads' this from memory and becomes more confident to tackle words. Words linked with some topic of interest to the child are then learnt and he progresses also to carefully graded material from picture cards and pre-readers. Tracing, writing, memorising and other simple learning techniques are used. Phonic analysis is undertaken in the later stages and simple comprehension exercises are included to develop reading for understanding.

A second method has been used at the Remedial Centre at Burton-upon-Trent. It is really an adaptation of the Schonell approach for work with small remedial groups of up to 12 children. The children meet informally as a class and begin by colouring series of duplicated outline pictures illustrating rhymes. They continue to do this until the rhymes are mastered and the children can recognise the familiar words by sight. Their interest is maintained by reading games. The next step is the assembly of several duplicated sheets to make a picture story. The word games continue. By the end of this period the children are ready to begin reading simple books. Progress in reading comprehension is ensured by the use of additional work sheets. The following is an example of the simple reading material and of the reading exercises:

THE BEAVER

(Illustrated by picture of Beaver in the Woods)

This is an animal with a funny tail.
He is called a beaver.
His home is in the water.
Colour the beaver brown.
Put a yellow ring round the beaver's funny tail.

> The beaver works, but the squirrel likes to play.
> The beaver can make trees come down.
> You can see this in the picture.

The third method to be reported was developed in East Sussex in 1952. It is phonic and duplicated books were used. They were specially written for older retarded readers of good intelligence and made use of diacritical symbols—a modern use of a nineteenth-century reading aid. The content of the stories was a feature of the series for the aim was to interest discouraged children. All the words in book one were phonetic. They could be read easily by phonetic methods. The style of presentation used in this book is shown below:

th-i-s i-z *th* b-oo-k o-v n-o-n, s-e-n-s, b-u-t I a-m sh-oo-r U w-i-l r-E, a-l, I-z *th*-a-t w-I-l n-o-n, s-e-n-s i-z g-oo-d f-u-n, ow-r i-n, t-e-n, sh-u-n i-z t-oo l-er-n t-oo r-E-d a-z s-oo-n a-z p-o-s, i-b-l. w-o-t U ar d-oo, i-ng n-ow i-z t-oo l-er-n w-o-t are k-aw-l-d

phonetic sounds
f-O-n, e-t-i-k s-ow-n-d-z

Phonetic spelling based upon common phonetic consonant values was used. Small letters were associated with 'short' vowels. The long vowels were indicated by capital letters which 'said their own names'. There was a series of books and phonetic clues were gradually dropped. The reading age of the final book was nine years. This approach indicates the resourcefulness of an education authority psychologist at a time when books for older backward boys were in limited supply.

A fourth scheme has been developed by Mr C. Moxon during many years of teaching in London. This method has been taught to psychologists at the Maudsley Hospital, and has been used in several educational experiments (e.g. Champness, 1953; Ace, 1956). The children are given boxes containing green, white, red and blue counters on both sides of which are printed letters and letter combinations. Vowel and vowel digraphs are printed on green cards, consonants and consonantal digraphs on white cards, danger sounds on red cards, and certain common word endings on blue cards.

On green cards		*On white cards*	
a . a	ai . ay	b . p	ch . sh
e . e	ea . ee	c . k	th . wh
	ea . e	d . t	f . ph
	ie . ey		
i . y	ie . uy	f . v	
o . o	ow . oa		*On red cards*
	ow . ou	g . j	gh . o
u . u	ue . ew	h . qu	ough
	ue . oo		
ar . ar	are . air	h . w	ould
er . ir	air . ear	l . r	e . e
			On blue cards
er . ur		m . n	ed . ed
or . aw	all . awl	s . x	es . le
or . au	all . al	s . y	ly . ly
	oi . oy	s . z	ing . tion

Characteristic illustrations occur with some letters, orienting the child visually. Thus a 'tongue' is drawn under 'th'. This gives the clue to the origin of the method—the teaching tricks in classrooms of long ago.

Reading machines are used. They repeat the colour code and emphasise one method of word attack—to begin each word with the vowel, to build up the 'tail' or final sound(s) and then to put on the 'head' or initial sound(s). This practice is enforced by the slotted hinged card which when appropriately folded reveals first the vowel part and then the remainder of the word in the desired sequence. For example, if the child has failed to read the word 'card' he first finds the vowel. Looking at the chart in the lid he finds the digraph 'ar' on the green background. He finds the right counter and inserts it in the machine, then adds the 'd', reads the sound and finally adds the initial 'c' sound.

Reference charts are displayed around the room to indicate the sounds made by the various letters and letter combinations. These guides are various and ingenious, e.g. the five vowels are printed on flaps which the child raises to reveal vowel and vowel digraphs having the same sound as the vowel names on the flaps—red coloured stars here and there imply danger and suggest a cautious approach; a card showing a saw, the word 'saw' underneath with the letter 's' crossed out indicates the sound of 'aw'; alphabet letters are printed on pictures representing objects of which they give the initial sound. There are many cards facilitating the appreciation of sounds, helped by the correct colour.

Once the child has mastered the rudiments of the method he is encouraged to go around and find out for himself and solve his own problems.

The fifth method has been used in a Birmingham school by Conduct and Ward (1955). It blends phonics with 'look and say'. The phonic work was independent of published reading schemes.

The phonics concentrated on the sounds needed most by 8-year-olds. They began with the five vowels, followed by the mute 'e'. Next followed 'y' as in fly and pity. Then came the digraphs in tie, meet, road, blue, Joe, seat, loud, soon, pay, rain, grew, claw, point, joy. 'Ow' which has two sounds, cow and low, was taught as in cow first. The other sound was taught later to avoid confusion.

The remaining sounds were 'ar' as in far, 'er', 'ir' and 'ur' as in fern, dirt, hurt, 'or' as in horn, 'air' as in pair, 'all' as in small, 'ck' as in brick, 'ch' and 'tch' as in much and patch, 'sh' as in wish, 'wh' as in whip, 'th' as in thank, 'qu' and squ' as in queen and squib, 'ng' as in song, 'ce' as in race, 'ge' as in rage, 'dge' as in edge, 'igh' as in sight, 'tion' as in station, 'kn' as in kneel, 'mb' as in comb and 'wr' as in wring. The sounds of 'ore' as in shore and 'are' as in mare were taught as separate sounds as they are not recognisable as 'o' and 'a' with mute e except in some dialects.

Before the scheme of teaching began diagnostic phonic tests were applied and deficiencies listed on classroom charts. The children filled in the gaps in their knowledge by working through Beacon Phonic Charts in their spare time. Special lessons on phonic sounds were given, and phonics were revised by flash card games. The daily allocation of time was 10 minutes for word lists, 20 minutes for group reading and 10 minutes for individual testing on the phonic cards.

These methods chiefly direct children's attention to the visual and auditory mechanics of reading. It appears to the investigator that the methods of introducing reading are equally mechanical in the majority of remedial teaching experiments. Notwithstanding a sugar coating of 'play' or 'therapy' there is an atmosphere of sense training that recalls the work of Pereire (1780), Itard (1799) and Seguin (1846). In *sensationalism* it was assumed that to train the senses was to train the mind. The emphasis by remedial teachers on the visual, auditory and articulatory elements in words contrasts markedly with a lively learning situation recommended by Mellor (1950) who wrote:

> A great deal has been said and written about the teaching of reading, but is it really such a difficult and complicated matter as we have been led to believe? Has the problem not been largely one of our own making? We have been so concerned lest children should not learn to read that we have divorced the skill from its purpose and its context. Forgetting that children will learn the skill in order to solve their own problems in real living, we have shut them off from real living, and put them in rows of desks and imposed their learning upon them, not as the outcome of *their* purposes but because *we* had a purpose for them. We have introduced reading through single letters, which have no meaning for the child, at an age when he was unable to think in terms of symbols and because this seemed hard for him we have invented a 'practical' approach through apparatus, as a means of coating the pill. Children can now be found, in countless schools, wasting their precious years of childhood fiddling about with bits of cardboard on their desks, when they might be *living* and coming to the use of books as a real need. The raw material of reading is *books* and not apparatus, and children will learn to read by listening and reading, as they learn to talk by listening and talking.

B. SPELLING

Spelling is a skill which developmental psychologists feel is little related to teaching. Olson (1957) has said: 'It appears probable that growth in ability to spell is related to extensive reading, maturational factors, and to need for use in communication.' Nevertheless the remedial approach is based upon the learning of *bonds*. Spelling has been described by Schonell (1942) as 'a complex sensory motor process the efficiency of which is based on repeated motor reactions to sensory stimuli'. The two following methods are examples of suggestions for the treatment of weak spellers. The first derives from Durrell (1940). A word is first presented on the blackboard or a flash card. It is then pronounced by the teacher. Next the children say it. Difficult words may be repeated several times. This is followed by the systematic study of words. Questions and discussion are used to build associations with words. The meanings of words are clarified by planned conversations. Stories, dramatisations, games, pictures, etc., are used to illustrate the meaning of completely new words. Older children use dictionaries. The next stage involves the reproduction of the words. Each word is written down, covered, and then the children attempt it. In most cases the presentation of the word on the blackboard during the previous period of discussion should have made it familiar to children and given them a clear visual image. The children make use of the word in sentences. Finally words are tested by dictation.

The second method was used at the Hospital School, Great Yarmouth, in 1952. It involved kinaesthetic sensibility. The teacher first said the words which were then repeated by the children. Next the words were spelt out letter by letter, then again by syllables. After this each word was written out by the children three times, and then they traced over each word with their fingers simultaneously spelling aloud. Reproduction was attempted, the children making trial recalls and then trying to write the words from memory. This step would be repeated until accuracy was obtained. Finally the words were written by the children in their dictionaries.

These two actual lesson plans have been suggested for the formal teaching of spelling to slow learners. Durrell also suggested that words should be written in sentences rather than separately in columns when spelling was tested, as this was believed to transfer spelling skills to running prose, as in composition. Spelling may also be linked more closely with writing by noting the letters that give most trouble to individual children and setting extra exercises featuring them. It was also noted that backward spellers should not be overloaded with new words to learn, for the number should be reduced to a minimum based upon their day-to-day needs and everyday reading material, e.g. three words daily for spelling ages 6, 7 and 8: four words daily for spelling ages 9 and 10. Supplementary exercises could be based upon new words in reading material, errors in compositions, the learning of words in some meaningful context, as during a project, and on personal and pictorial dictionaries.

C. ARITHMETIC

The general trend of remedial schemes in this subject is suggested in what follows.

Until a child has an arithmetic age of 7 years activities involving manipulation, organisation and classification are vital. They steady the young mind on the bridge from things to symbols.

Occasional diagnostic tests sort out the number facts that children do not know. Even when the children know these facts automatically they may be misapplied owing to certain systematic errors. These may be grouped under seven headings (Scottish Council for Research in Education).

1. Errors involving zeros: $5+0=0$
2. Distortion of recall, mixing number facts: $3+5=15$
3. The repetition of something that has just been done (perseveration): $3\times5=3$
4. The allied tendency to double one unit: $3+5=10$ $(5+5=10)$
5. Sequences, a counting phenomenon: $3+5=6$
6. Inverse subtraction: $3+5=5$ (i.e. 3 from 8 leaves 5)
7. Errors due to misreading numbers, omissions, etc.

The effective remedial teacher must be skilled in the diagnostic appraisal and correction of exercises because the increasing difficulty of complex processes increases tendencies to error. Thus:

1. Inability to carry over the tens.
2. Ability to work with tens, but inability to carry over the hundreds.
3. Lack of experience with horizontal addition.
4. Difficulties due to individual experiences, e.g. the children who become confused when adding single numbers in a column merely because they are carrying a total in their head that is too great for their present level of experience.

Individual work and correction are very necessary in arithmetic. Many cases of persistent inaccuracy will pass unnoticed unless the teacher not only marks the sum, but also hears the child work it aloud.

The approach in arithmetic, as in the other subjects, is based upon the establishment of 'bonds' by oral drill. The Glasgow Child Guidance Report of 1955 makes this clear. It advocates the establishment of 'basic bonds'.

To conclude: by and large, as Fleming has stated, remedial methods are based upon normal class routines. Remedial methods in England and Wales follow the suggestions of Burt (1950), Schonell (1942), Fernald (1943), Gates (1947), Durrell (1940) and others. The treatment incorporates individual work, diagnostic tests, specially trained teachers and great use of aids and devices. The emphasis has been upon the mastery of devices, telescoped re-teaching, the management of learning rather than on the careful matching of teaching and child growth advised by Olson and Hughes. Remedial methods will again be discussed in Part III.

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CHAPTER 3

SURVEY OF RESEARCH INTO THE EFFECTS OF REMEDIAL EDUCATION

THE related research may be conveniently grouped according to the precision of experimental design. The experiments and investigations vary from simple studies of individual children to complex investigations in which control groups are included. There is a substantial literature but, as Olson (1957) states, it is difficult to interpret the real effect of remedial programmes. Seldom has there been a study similar to the investigator's in which a control group was set up comparable to the treated group from the beginning, and in which matched tests were given before, after the treatment, and after the lapse of a considerable period of time to test the permanence of effects.

A. CASE STUDIES

These involve the reconstruction of an individual's past with the aim of understanding his problems and of helping him to adjust. Human stories with emotional appeal grip the reader's attention but case studies are not sound starting points for generalisations about treatment. The single case is the lowest limit of imprecision in experimental design. The simple studies are characterised by naivety. The diagnosis is presented and the remedies are invariably successful. The case history of *Jeff* given by Cooper (Robinson, 1953) is typical:

> Jeff, C.A. 10 years 4 months, I.Q. 110 (M.A. 11 years 3 months), was working at an 8-year-old level. He did not mix easily with children so was isolated and apathetic at school, but he soon made friends with the adults at a Reading Clinic. There were several negative conditions. Physical examination indicated low metabolic rate and anaemia, and his parents needed guidance from the psychologist.
>
> Treatment began. Remedial play and reading sessions of one hour weekly continued for nine months. Books were chosen that appealed to his interests.

In nine months he had a reading age of 12 years, having gained four years in reading during the short period of treatment.

But qualitative material is included in some studies. This shows that rapid test gains are not the whole picture.

Hume (1926) for example, studied reading disability amongst 10,000 London school children. Only 2·5% of retardation was found but some children were selected for help. Kinaesthetic methods and the 'home co-operation' method (in which the parent tutors the child from assignments set by a teacher) were used.

One boy was 10½ years old. His I.Q. was 85 and his reading age, 5 years. Treatment lasted only six weeks but led to gains of nine months. However, Hume stated that this boy still seemed 'to lack the power to carry out even a simple act of analysis and synthesis'. She added: 'It is impossible to say yet whether this stage of reading can be accomplished: it is certain that a much longer period with sight words and much more reading of easy interesting material is necessary before this type of work can be seriously undertaken.'

The American pioneer worker, Fernald (1943), also made notes on children with extreme disabilities to suggest that marked gains follow kinaesthetic teaching approach, individual attention, simple handling and parental guidance. For instance, 26 cases of 'total disability' aged between 8 and 17 years gained 3·8 school grades during 6·9 months of remedial teaching; and 11 cases, tutored for 10·4 months, with an age range of 8-14 years made gains of 4·5 reading grades. But there was little progress on a literature test although reading test scores improved. In 4 of 15 cases the final Stanford achievement score in literature was *less* than that of the initial test. Some of the children were followed up to indicate the durability of the gains but the material is too loose to be reliable. Detailed notes are given on 66 cases scattered from 1921 to 1942. I.Q.s were high with two exceptions, and 33 cases had I.Q.s of between 110 and 140. About half the group had zero reading grades before training, the others had made a start at reading. Not one of the cases with initial zero scores was shown to have achieved any marked academic success. Typical reports are: 'Went to work. Very good report' and 'No report beyond satisfactory work fourth grade.' Fernald's evidence is most inconclusive.

Birch (1951) gave brief case notes on 49 of 53 children who received treatment between October 1948 and March 1949. The pupils at the Centre during this time were said to show very few specific and learning or emotional difficulties so their later school careers should have been good. But this was not so. Notwithstanding exceptional progress at the Remedial Centre three of four children with high I.Q.s who had entered the grammar school were failing. The fourth had made a poor start. Five children had transferred to a technical high school. Three were adjusting poorly. 39 had been admitted to secondary modern schools. They were said to be adjusting and some had achieved 'positions of authority', but the long-term effects of remedial work on this group are also inconclusive for the only statistical details are the *approximate* average scores of 18 'typical' cases. They may have made good progress at the Centre for they gained 2½ years in 10 months of treatment but the group had an average retardation of one year when followed up two years later. Five children did not benefit. One was committed to an approved school. The other four, I.Q.s 115, 102, 100 and 90, remained in special classes.

The simple case studies do not support the claims made for remedial reading. Little impression seems to be made on personality factors, for a study of Birch's thesis shows that serious character or emotional problems were still present after remedial treatment. We now turn to a complex case study reported by Bartlet and Shapiro (1956).

> The study describes *Tom* and his treatment at the Maudsley Hospital. Tom's home background had been unsatisfactory. He was slow to pass the infant milestones and did not learn reading although given remedial help. A diagnosis of 'limited mental ability' was made at the Maudsley. Unusual perceptual difficulties were also inferred and made responsible for both failure to adjust and failure to learn. Six months' remedial work led to improved reading. Remedial help was not given in arithmetic which, by contrast, remained 'elementary and halting'.

The report is vague. For example, the boy is described as of 'limited intellectual ability'. Yet at 6½ years his Binet I.Q. was 'low average', at 9 years it was 81, and at 10 years a Goodenough Draw-A-Man Quotient of 90 was obtained. The only low I.Q. 75 was scored on the WISC test. Discussion of the mental test variations would have been helpful. Other difficulties arise when one tries to unravel the child's emotional state. The labels 'pre-psychotic child who is ineducable' and 'severe psychiatric disturbance' could surely have been qualified. One is also led to question the educational diagnosis of perceptual difficulties, for when the Fernald tracing method was dropped because the child was uncooperative he 'proved able to learn and retain irregular words equally well using a look-and-say method when these words were introduced with care'. Had words been introduced without care? Was Tom uncooperative because, like a case described by Fildes (1929) years before, he was more interested in motor cars passing outside the teaching room than in reading by phonic analysis phrases like 'put the lamp on the cupboard'? The follow-up report has no scientific value. Test scores are not cited and the teacher's comments lack psychiatric insight.

> To summarise: Tom had gained a mechanical reading age of 7·1 years by the end of treatment. Yet he could barely read running prose. He took over 4 minutes 45 seconds to read the My Dog test making about 14 errors. The high comprehension score of 9 years claimed for this test appears valueless. The reading was so hesitant that meaning clues may well have been given by the tester's promptings.
>
> The follow-up report one year later stated that Tom's reading was 'almost average for age, comprehension is good, oral expression is good'. To reach this level Tom must have gained four or five years of oral reading ability in the *one* year after treatment. If correct, this steep gradient from non-reader to reader may well indicate that Tom began reading at the Maudsley Hospital, not because of the special treatment, but because he had reached the beginning of a new growth spurt. Yet this possibility was not considered.

A criticism from Millard (1951) seems relevant here:

> A second criticism of remedial instruction and one most frequently pertinent is the lack of necessity for much of what is done. In the elementary school a higher percentage of remedial attention is given to children who are hovering around the beginning point of a curve of learning. The result of efforts regarded as successful cannot be differentiated from learning which *might* have occurred without the benefit of special attention. . . . In many instances the results attributed to special methods would have occurred without the use of such methods.

Millard is not alone in these thoughts. Recent American accounts include case studies which challenge the assumption of mental age as the criterion of probable educational level, and the results of remedial teaching. Case studies are cited by Anderson and Dearborn (1952) to show the effects of individual patterns of growth. For example, the reading progress of two sets of brothers is described. This suggests that, at least in some cases, reading gains are merely coincidental with treatment. Such a thought, says Millard (1951), 'challenges the whole concept of remedial attention as it is conventionally regarded'.

B. SIMPLE GROUP STUDIES

These make up the bulk of the literature but are no improvement upon case studies as the mere aggregation of cases does not increase validity and groups that have chanced to receive help are not representative of any population. In addition most of the reports are too low in precision to justify any generalisations whatever. For example, an education officer (*Times Ed. Supp.*, 1953) has told of the success of an experiment in his county:

> '. . . in which backward children were coached in groups of six or eight for two periods of an hour each week: the average gain in reading age after seven months was nearly two years', and notwithstanding the absence of experimental design, lack of control group and failure to assess the permanence of improvements, his report continues, 'This shows what can be done with proper instruction in groups small enough to allow individual attention.'

Typical group results are summarised in the following Table:

TABLE III

EXAMPLES OF REMEDIAL TREATMENT GROUPS

Research	*No. of children*	*Av. C.A.*		*Av. M.A.*		*Period months*	*Initial score years*	*Gains years*
		y.	*m.*	*y.*	*m.*			
Adams (1940)	32	9	9	9	8	4	7 +	2·7
Carey (1928)	12	10	1	9	1	3	7 +	1·4
Taylor (1940)	34	10	6	7	7	6	8·1	1·6
Schonell and Wall (1949)	11	10	1	10	3	9	7·5	1·0
Gunzburg (1948)	30	13	6	9	7	6	9·5	1·8
Ace (1956) (*a*)	33	8	0	7	9	6	5·2	1·6
(*b*)	32	8	0	7	9	6	5·2	2·1

Observations on the progress of remedial groups by Burt (1950), Birch (1949), Wheeler (1927), Valentine (1951), Conduct and Ward (1955) and an American, Fogler (1950), are not included as the figures for the columns are not clear from their data.

The table shows that groups are generally small. There has also been a tendency to generalise from incomplete groups. Wheeler selected 16 cases for remedial arithmetic. Only 12 completed treatment. Their average gain after three months in arithmetic sets was 1·3 years. Previous teaching had been bad. Birch (1949) also cites scores based on 'the 64 children for whom there are complete results'. Good results are claimed but the children were tested every three weeks with the Burt graded word reading test. The improvement of this group omitting the 'eight who failed for one reason or another to complete the course' was 1·9 years in six months from an initial average reading age of 7·2 years. Valentine (1951) also cites results only for 'the number completing the course'. This practice is not only common but can reach absurd lengths. One educational psychologist sent the investigator data on which gains were claimed. The report omitted absentees and six unsuccessful children. This left only 29 members of an original group of 50. An article by Friedmann (1958) suffers from the same defect.

The second unscientific feature of group work is the emphasis on gains, and the neglect of other statistics. Valentine omitted the initial reading age. Gunzburg's (1948) account forces one to make approximate estimates of ages and scores. Conduct and Ward omit the average I.Q. of their class and give only sample sets of results. Schonfield's (1956) data are not clear. The same criticism applies to reports from the United States. Hildreth and Wright (1940) affirm the value of remedial education on the basis of teachers' qualitative judgments. Yet several of their children showed little change when initial and final test scores were compared. Fogler also presents his data awkwardly. This study will be described in more detail as it includes follow-up tests.

The 18 pupils in his group were 'selected on the basis of need for special instruction'. The average I.Q. was 81. The age range was from 8 to 13 years. Tutoring was given by two trained teachers for three months. The methods followed the normal pattern of drills, phonics, simple readers and comprehension exercises.

The result was an average gain of 1·2 years. Two years later all but one of the original pupils were retested. The aim was 'to watch the pupils studied . . . to see whether they maintained their progress without additional remedial instruction'.

The rate of gains associated with the period of remedial work did not continue. Three pupils regressed in attainment, six others did not even gain 10 months in the two years of follow-up and only five improved more than 20 months of reading age. No permanent tendency to advance was established by the remedial work.

The figures in Table III show that gains occurred whether the groups were retarded behind mental age or advanced above it. Gains of about the same order occurred whether the treatment was given to small groups, to single children or to children in classes. Carey's was small group work, Schonell and Wall's mostly individual, Gunzburg and Taylor gave treatment to large classes. Mitchell (1948), an American, has also reported an experiment involving a school as a whole. Work was carefully planned and better books were introduced. The 207 children gained 11 months in 7 months. A proportion of gains is no doubt due to previous inadequate and incorrect instruction. That has been noted by other research workers. For example:

> Wheeler (1927): It is apparent that school conditions were the potent factor in producing the degree of backwardness. . . .
>
> Adams (1940): *George* did not like his school or his teachers, and they thought that he only needed whacking into a state of attentiveness. When taken out of the normal class routine and treated by individual methods, coupled with simple human kindness, sympathy and suggestion, he soon relaxed and his untidy work and poor memory for number improved. His teacher, however, noting the treatment remarked, 'Aren't you being too kind to the boy?'
>
> Betts (1950): The need for remedial reading programmes is reduced almost to the degree that each teacher assumes the responsibility for developing reading abilities in all areas of learning where reading materials are used.

Some of the gains will represent the transfer of training to the re-test material. Thus Ace used the Schonell and Moxon methods. It is not surprising to find the larger gain on the graded word reading test was made by the group taught phonetically.

The chief fault of these simple group experiments is that gains are based upon *immediate* test results. Ellis (1949) has calculated relationships between gains in reading and other variables. He found a correlation of +0·62 between remedial teaching and improvement. Earlier Monroe (1932) made similar calculations. But such calculations reveal nothing concerning the factors likely to be linked with permanent gains. In fact remedial studies can be found that contradict Ellis and Monroe. The report from Kingston-upon-Hull (*Education*, 1957), in contrast to current beliefs, states that 'dated' books may be used successfully, that an I.Q. of 85 does not necessarily presuppose a proportionately slower rate of progress than a higher quotient, that mental age does not represent potential attainment in every case, and that gains are not related to incidence of treatment. The report states:

> There has not been any evidence to show that there is any fundamental difference in results between groups taught for a quarter session daily and those taught for half a session three times a week or even twice a week, while at the extreme quite large improvements are noted in those children taught for only half an hour weekly in the Child Guidance Clinic.

The two researches by Gunzburg (1948) and Champness (1953) are of particular relevance now that Yates and Pidgeon (1956) have recommended that 'diagnostic and remedial teaching should be applied to *all* children whose attainment is low . . .'. Gunzburg has reported the improvement of reading in a class of high-grade educationally sub-normal boys. His investigation covered 2½ years' work in a large residential school. Boys with I.Q.s ranging from 55 to 92 took part. The experiment had three aspects, each emphasising a different reading skill. The remedial teaching consisted of word-recognition drills and exercises to increase reading speed and comprehension. The time given to remedial work was greater than in any other study. The boys spent a quarter to half their school time reading. The drill and the feverish atmosphere in which it took place may be gathered from the quotations:

> Besides the endings, sound combinations of all kinds were practised. Following is a short sample, demonstrating the basic principles of the approach. This example is built around the word endings -tion, -sion. Nonsense words and real words are used alike.

mo-tion	fi-sion	mo-fi-sion	mo-fi-mo-tion
na-tion	le-sion	na-le-sion	mo-na-le-sion
ra-tion	mi-ssion	re-mi-ssion	fi-mo-ra-tion.

> . . . Special note must be made of the atmosphere of general enthusiasm and energy kept up by the class throughout the whole length of this—for me—very tedious part of the experiment. Boys were definitely keen on proving to others and themselves that they were not 'dopey' or 'barmy' and were very grateful of being given the opportunity 'to get level with the outsiders'.

Champness, his most kindly critic, has said that Gunzburg's conclusions lack the support of adequate data. The experimental results do, in fact, suggest that (*a*) the gains are due chiefly to practice effects arising from the similarity of training and test material, and (*b*) the ultimate effects of the 2½-year programme may have been insignificant. Gunzburg himself admits that 'the reading drill had more or less artificially raised the ceiling of reading accuracy'. The second possibility (*b*) is suggested by a final table giving the results of 11 boys who took part in all phases of the experiment. The percentage scores on Gates tests are set out in the table, but these do not seem to be of psychological importance when converted into Gates accuracy scores. The scores suggest that the children were inferior on three of the tests given at the end of treatment to their status at the start, and the change on the fourth test was only a change of one child moving into the top 40%.

Champness' study is referred to by O'Connor and Tizard (1956). First a setting is given for the plea for remedial reading with mental defectives. It is implied that 'some of the brightest patients were illiterate or virtually so'. The group average I.Q. was 70. But if the group used by Champness (I.Q. range 102-55) is split at the point of semi-literacy (reading age 9 years) there are significantly more I.Q.s of 70+ with good reading ages. (Chi-square = 4·54, $P < 5\%$.) Not one single case occurred of an I.Q. of 75 with a reading age below 7·9 years. Not one of the bright patients used by Champness was 'illiterate or virtually so'. The twelve who had reading ages of 5 years or less had a mean I.Q. of 63!

Remedial teaching is then assumed to be so 'successful' that 'current educational theory inclines to the view that even with dull children it is possible to bring reading standards up to the level of general ability as measured by intelligence tests'. Neither of these opinions appears to be substantiated by a re-valuation of previous research. O'Connor and Tizard claim the support of Gunzburg's experiment for their argument. But that experiment is inconclusive.

Finally, Champness' results are quoted. On the basis of gains made by the experimental groups, it is suggested that reading can be easily taught to institutionalised mental defectives. Certainly gains are claimed, but no untutored control group was used as a check. Nor is there any mention in O'Connor and Tizard's account that the subjects received tests at least four times in five months—before teaching, at two months, three months and five months. The practice effects, apart from special transfer of training from the teaching exercises, would be large especially on the untimed Schonell comprehension tests in which improvement was greatest. Champness had noted that 'the gain of 1·7 years in spelling may be claimed to be partially a result of test unreliability' and that at least one large gain in comprehension was 'due to the standardisation of Comprehension Test A'.

This completes the review of small group work. It would appear that opinions based upon such work are highly unscientific. The accounts at best represent only a beginning stage in research. At worst they are pseudo-scientific propaganda.

C. A COMPLEX GROUP STUDY

Burt and Lewis (1946) conducted two experiments with backward readers that demonstrate the use of analysis of variance. Five teaching methods were investigated, the alphabetic, kinaesthetic, phonic, visual and a mixed approach. The first experiment included 16 boys and 16 girls with an average age of 10 years 4 months, an average I.Q. of 78·6 and an average reading age of 6 years 10 months. The average retardation was only 1 year 4 months. The children were taught in groups of four and the phonic, mixed, kinaesthetic and visual methods were used. Two 30-minute periods were held weekly for one year. The average reading age for all the children rose to 8 years 5 months. No child succeeded in reaching a reading age equal to his mental age. The greatest gain was two years, and the least was three months. Training was continued for periods varying from 6 to 18 months for about one third of the children. The speed of reading gains slackened. Burt and Lewis inferred 'that the larger increments (made in the experiment) are due chiefly to the fact that the children were making up for what they had lost during previous years at school'. But the apparent slackening may indicate that there is a limit to practice effects and to the extent that so-called retarded children can be thrust beyond their true levels of growth.

The differences between teaching methods at the end of the experimental treatment were significant. The visual seemed best, the kinaesthetic and mixed were not quite as good while the phonic was the poorest. Champness (1953) had also used three different methods of teaching with his sample. One method was mixed, another was phonic. No statistical method differences were found but this may have been due to another factor. The instructor was not a trained teacher. Burt's results have also been controverted to some extent by Conduct and Ward (1955). Burt and Lewis's second experiment was designed to assess the relationship between previous methods of teaching and the children's responses to remedial work. It was concluded that the results of treatment depended in part upon the way a child had originally been taught and that 'on the whole, a change of procedure appears more productive than renewed efforts with an old procedure with which the child is already familiar'.

Burt and Lewis believed that remedial work nearly doubled the expected speed of progress. But as the tests were given immediately after treatment when practice effects were likely to be most evident, and the slowing up of the rate of gains of children treated for the additional period was not further investigated the experiment proves nothing concerning the effects of remedial teaching.

D. GROUP STUDIES OF PLAY THERAPY

The depressing effects of unsympathetic teaching have been noted by Stephens (1948), Adams (1940), Bell (1954), Schubert (1954), Vaughan (1941), Neuber and Snyder (1947) and Hansburg (1949). Schubert regarded the personal bond as of first importance:

> Remedial reading is often, therefore, a medium for the therapy of personal maladjustment and although methods have some importance, the children would make gains even if the teacher were to prescribe weight-lifting as a method of reading improvement.

There has been little research into the effectiveness of play therapy. Axline (1947) reported a play and activity class approach to 29 boys and 8 girls, aged 8 years, who were poor in reading. Improvements were claimed but there was so little attempt at experimental precision that Scott (1954) said that the report had an air of 'wistful hopefulness'. Lebo (1953) has also noted the cheerfully persuasive nature of research into play therapy.

Bills (1950) used two complementary studies to evaluate play therapy experimentally. Eight backward readers aged 7½ to 9 years took part in each study. One group was poorly adjusted, the other was well adjusted. Bills concluded that play therapy improved the learning rate of maladjusted readers while well-adjusted readers failed to make significant improvements. The evidence is most dubious. Only 16 children took part. They acted as their own controls. Treatment lasted for six weeks and supplementary tests given to assess the permanence of changes were applied only six weeks later. Also the sample statistics suggest that the results may have been biased by a number of uncontrolled variables. The maladjusted children were on the average 0·8 of a grade younger and 28 points of I.Q. brighter than the well-adjusted. Matching was poor and errors of measurement would be impossible to estimate.

Fisher (1953) gave psychotherapy to one of two parallel groups of six children, three years retarded in reading. The groups were made up of boy delinquents, aged 11+, with an average I.Q. of 92. They also received remedial reading tuition. Non-directive therapy was said to have led to greater improvement by the treated group. This group gained 11·5 months in 6 months. The other group gained 8·25 months. Pupils are so variable that the difference could have been due to uncontrolled variations, yet the investigator inflated the mean difference in percentage form, saying, 'The group receiving therapy made the greatest advance, 39·4% greater improvement in reading than the controls.'

Investigations into the effects of therapy do not appear to have taken place in Britain, but some light has been shed on the matter by Curr and Evans (1950), Gardner (1942, 1950), Taylor (1949) and Kemp (1955). Children become less tense when satisfying activities are introduced suited to their levels of development. However, the main determinants of attainment appear to be social and emotional because the study of the effects of 'progressive' and 'orthodox' teaching upon levels of attainment suggests that teaching methods make little difference.

E. EXPERIMENTS WITH CONTROL GROUPS

A pioneer study supporting remedial teaching was reported by Monroe (1932). There were three groups. Group A was given extra tuition by 35 well-trained tutors for hour or half-hour sessions. Group B remained in their classes with occasional extra help. Group C received only class teaching. The results are set out below:

TABLE IV

SUMMARY OF RESULTS OF MONROE'S THREE GROUPS

Group	*No. of children*	*C.A. y. m.*	*M.A. y. m.*	*Time elapsed months*	*Initial rdg. age y. m.*	*Gain months*
A	89	10 1	10 2	6·8	7 10	1·39
B	50	11 7	10 4	7·1	8 0	0·79
C	50	10 5	9 6	8·2	7 8	0·14

The precision of this experiment was low. Monroe claimed that 'children who have difficulty in learning to read do not usually overcome the difficulty under ordinary school instruction, but are able to make normal and accelerated progress under special methods adapted to their difficulties'. Yet many children in the treatment groups were still retarded when treatment ended: 64% in Group A and 86% in Group B.

The failure of the controls to progress gives substance to the idea that retarded children remain stationary unless help is forthcoming. This is mentioned by others. Birch (1951) refers to the group of 24 secondary modern school children in Burton-upon-Trent who improved by only 0·2 of a year when in schools without remedial work. Schonell (1942) has also said that children have made between 0·75 and 1·75 years of progress in reading when treated, 'while corresponding groups left within the class organisation made only 0·1 to 0·3 of a mental year's progress'. Monroe made other studies (e.g. 1937) but no controls were used. The remedial work, however, does not appear to have produced the results claimed.

It is difficult to account for the meagre progress of Monroe's controls. There were many retarded children in American schools at that time (Durrell, 1935). Schmidt (1946) also found few changes in her control group. Perhaps American regimented public instruction was responsible.

A search through available reports from the United States has not revealed important experiments with school children incorporating control groups. Work in North America appears to be as unsatisfactory as British research. Scott (1954) described reading research as a 'forest' of inconclusive work, limited and poor in quality. He refers to Robinson who reviewed nearly 100 studies and found 'less than a dozen references to the effect of reading programmes upon scholastic improvement. Of these only one study having control groups reported apparently significant gains in terms of academic grades for reading classes.' Since then Strang *et al.* (1955) do not appear to offer convincing evidence of the beneficial effects of treatment.

In England Schonell (1942) matched treated and control groups. This is a simple experimental design of low rigour. The experimental group was given planned individual aid in reading. The experimental statistics are set out below:

TABLE V

SUMMARY OF STATISTICS OF AN EXPERIMENT BY F. J. SCHONELL

Group	*No. of children*	*C.A.*		*M.A.*		*Time elapsed months*	*Initial rdg. age*		*Gains*	
		y.	*m.*	*y.*	*m.*		*y.*	*m.*	*y.*	*m.*
Treated	31	9	6	8	7	9·1	7	3	1	3
Control	54	9	7	8	9	9·1	7	2	0	5

The range of gains was from 4 to 41 months for the tutored children and from 4 to 11 months for the controls. The controls did not remain stationary despite the general belief that they would not gain, and some members of the treated group apparently fared no better than control children although given remedial help.

Eleanor Schonell (1957) has reported a similar experiment in which cerebral palsied children at a special school were compared with similarly handicapped children in other types of school. There were 17 children in each group. They were very young, the average age being 7·6 years. The mental ages of the experimental and control groups were 6·9 and 6·8 years respectively, while both had the initial average reading age of 5·8 years. After one year the children at the spastic school had gained 2·2 reading years and the controls gained 1·1 year. It appears, therefore, that even handicapped children make progress in classrooms, and the ultimate value of the greater gains of the special school group is questionable as in all attempts to stimulate educational growth there is a tendency for the immediate effects to disappear after a lapse of time.

The last experiment to be reported in this section is the only well-designed study. Curr and Gourlay (1953) set out to answer two questions fundamental to remedial education: (*a*) what measure of success can be obtained? (*b*) how can the children most likely to profit from treatment be selected? Eight Birmingham schools took part and the tutoring was given by diploma students at the University. Children were selected on the usual basis of test score discrepancies and by class teachers' judgments. Control groups were obtained by matching the experimental pupils. There were four groups with 32 8-year-olds in each. Remedial work alternated between subject coaching along approved lines and activities to maintain interest and release tension.

The tutoring lasted six months. Gains were estimated by subtracting the mean gain of the control group from that made by the treated group. The gross gains of the test-selected remedial groups were 13·2 months in reading, 12·9 months in arithmetic and 11·2 in spelling. The net gains were 4·7, 2·2 and 0·4 months respectively. The teacher-selected pupils made gross gains on the Schonell tests of 7·9 months in reading, 12·0 months in arithmetic and 6·5 months in spelling. Their net gains were 0·7 and 1·9 months in reading and arithmetic. There was a loss of 4·1 months in spelling. The only gain that was statistically significant ($P<5\%$) was the 4·7 months obtained by the test-selected children on the Schonell comprehension test; but both test and control groups showed about the same improvements on certain unstandardised tests.

Curr and Gourlay concluded that 'the experiment cannot be used as evidence to support the view that it is better to use a screening procedure in selecting pupils for remedial instruction than to rely on the class teacher's judgment. Neither, of course, does it disprove this view.' The second conclusion was that the research was 'an implied challenge to workers in the field of remedial education', as subject gains were negligible. Even the significant reading gain may have been due to special coaching effects.

This experiment has been criticised by Birch (1953) and by Kellmer Pringle and Gulliford (1953) mainly because the controls may have been stimulated by the experimental situation. But the findings of Curr and Gourlay have been confirmed by the investigator's experiment.

This completes the review of research.[1] It appears that the claim that remedial treatment is desirable and beneficial is based upon studies in which mechanical teaching has predominated and which are weak statistically. There is also an inexcusable lack of objective follow-up of cases to assess the permanence of treatment. Finally, failures are seldom referred to, although it is clear that failure occurs.

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[1] Several additional studies which have been reported since this was written are reviewed in Chapter 11 (page 129).

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PART II

THE PRESENT INVESTIGATION

THIS investigation has two parts. The progress of children who attended the Remedial Education Centre of the Institute of Education, University of Birmingham, has been analysed, and remedial treatment has been experimentally investigated. Both parts include a follow-up of the cases. This may well be the essential contribution of the research for the number of controlled studies of actual changes of attainments over lengthy periods of time is so small.

The investigation is in two parts because the evidence from a single study can hardly be expected to settle any theoretical controversy. When the results are negative, critics (e.g. Gordon, *Education*, 1957) link them with the artificial nature of experimental procedures. The negative results reflect 'arbitrary' teaching arrangements and 'imposed' time limits rather than the true effects of remedial work. But the investigator was aware of these possibilities before he began, and combined the study of material from cases actually treated at remedial education centres with the experiment itself. The experimental design too is of high precision because the study of related research had suggested the many likely pitfalls.

It is hoped that what follows will give a distinct answer to the question: 'What are the effects of remedial education?'

CHAPTER 4

THE RESULTS OF TREATMENT OF PUPILS AT THE REMEDIAL EDUCATION CENTRE

THE Remedial Education Centre has been described elsewhere by Schonell and Wall (1949). Children attend the Centre from schools in Birmingham and Smethwick. They are tutored individually or in small groups by University students reading for diplomas in the psychology of education. The remedial approach is governed by an eclectic theory of education. Diagnostic testing is followed by remedial exercises and play therapy, while excursions and activities are devised to stimulate interest and to maintain it. A psychiatric social worker discusses the needs of pupils from time to time with tutors and parents and advises when necessary. The children, mostly boys, attend for one university year, or until their improved attainments and conduct justify discharge. They then return to ordinary class teaching.

A. REMEDIAL CENTRE CASES

The analysis of data accumulated at the Centre since October 1948 yielded 116 referrals. There were 83 boys and 33 girls. 89 cases were accepted for treatment, and by June 1951 45 children referred for reading disability had completed a course of remedial sessions. The case histories of the children in this group were studied carefully, and follow-up tests were given in June 1952. For a number of reasons, change of school, absence, movement from the district, etc., only 24 were located. The half appear to be representative of the whole as is shown in Table VI.

The children were of good average intelligence, half-way through the junior school and approximately 2 years 6 months retarded in reading. Their home and emotional backgrounds tended to be abnormal. General domestic mismanagement and friction between parents and children were factors in 40 to 50%. Inadequate or inappropriate instruction affected 25%. Specific sensory handicaps were not frequent but poor general health was common. The children showed a number of stress symptoms. 75% showed nervous habits or were at least noticeably restless, poor in concentration or diffident and apathetic (see Appendix, pp. 144-5).

Tests of mechanical reading given before and after treatment show that the group of 45 made an average gain of two years in an average time of 1 year 1 month: final reports also suggest that the behaviour of 26 children had improved, that 16 were unchanged and 3 had deteriorated. The immediate effects of remedial treatment appear to have been beneficial.

TABLE VI

THE FORMER CENTRE CASES (1948-51)

	All cases, no. 45 (average)	*Followed-up cases, no. 24 (average)*
Sessions attended	29·0	27·5
Months attended	13·1	13·1
Intelligence quotient	108	109
	y. m.	*y. m.*
Chronological age	9 8	9 8
Initial R.M.T.	7 11	7 9
Final R.M.T.	9 11	9 8

The treatment given by students at a university might not be as good as work at a remedial centre conducted by a local education authority. Comparison was essential. To do this the investigator visited a remedial centre in the Midlands and obtained particulars of 48 representative children who had completed treatment between 1949 and 1951. Their average age was 8 years 9 months, average I.Q. 108, and their total time of attendance was similar (12·7 months) to that of the Birmingham sample; but there was great disparity in the number of attendances and in hours of actual treatment. The university group had made an average of 29 attendances scattered throughout the university year while the Midland group was tutored on the average for 156 daily 1½-hour sessions. Yet the gains made by the groups were identical.

At that time it appeared surprising that the end products of such different treatments could be the same. One professor said that it might be because the University Centre was freer, better equipped and the more stimulating. But the phenomenon has now been observed elsewhere (see p. 29). An investigator in Kingston-upon-Hull explains it by a relationship with the attainment of a reading age of 7½ years. He believes that consistent improvement may be maintained with less regular instruction after this period. But this opinion flatly contradicts and is contradicted by the observations of Schonfield (1956) and of Irvine, Lewis and Howard (1956). It is not improbable that all are incorrect. Schonfield's data are not clear and the work in Exeter has not been carried out in an experimental setting. The gains may be the movement forward of individual children in response to growth and practice effects.

Remedial education is said to advance children's attainments to their mental ages but this did not take place in either group. The average retardation was still *significant* after treatment. Thus the discrepancy between intelligence and attainment was reduced in the Birmingham group from 2 years 6 months to 1 year 8 months and in the Local Authority group from 2 years 8 months to 1 year 9 months. A high proportion of the group was still grossly retarded when discharged.

B. THE FOLLOW-UP OF THE PAST CENTRE CASES

All the past Centre cases that could be traced were re-tested in June 1952. Their teachers also made reports. The test results follow:

TABLE VII

THE INITIAL, FINAL AND FOLLOW-UP TEST RESULTS OF PAST CENTRE CASES

	Score on entering		*A.Q. 1*	*Score on leaving*		*A.Q. 2*	*Follow-up score*		*A.Q. 3*
	y.	*m.*		*y.*	*m.*		*y.*	*m.*	
C.A.	9	9		10	10		12	3	
M.A.	10	7		11	10		13	3	
R.M.T.	7	9	73	9	8	82	10	6	79
R.C.T.	8	1	76	9	10	82	10	5	79
Spelling T.	7	0	66	8	3	70	9	0	68
M.A.T.	8	6	80	9	8	82	10	9	81

The average time between the initial and final tests was 1 year 1 month, and 1 year 5 months elapsed between the final and the follow-up tests. No marked changes took place in achievement quotients. The teachers' reports indicated that school attendance had been regular: that seven children were still attending junior schools, two were at all-age schools, 13 at secondary modern schools and two were at technical schools. There were five children in A streams, nine in B streams, six in C streams and four in heterogeneous classes. Ten children were in the top and 14 in the bottom halves of their classes.

The behaviour of the children in school had been assessed by ratings on five traits recommended by Highfield (1951). Ratings for *persistence* and *attitude to adult authority* approximated to the normal curve, but the children were distinctly below average in *self-confidence*, *concentration* and *enterprise*. The completed teachers' reports thus suggest than in June 1952 the group was below average.

It would appear that there were only slight changes in attainment as a result of remedial treatment. The effects of treatment were much less than had been commonly believed and achievement quotients remained very constant.

C. AN ANALYSIS OF THE TEST PAPERS OF THE 24 PAST CENTRE CASES

This analysis has been made because it is often forgotten that the actual basic skills of children are sifted by tests. Identical numerical scores may be obtained in many different ways:

1. *Reading*

The children were not all non-readers at the beginning of treatment. On the average they could read 28 words correctly (R.A. 7·8). But half the group failed very simple words:

> frog, road, clock, train, light, picture, think,
> summer, people, something.

By June 1952 the average reading age was 10·5 years. Thus the group with an average age of 12 years 3 months, average mental age 13 years 3 months, had improved by 33 months of reading progress in the 30 months. The children were on the average 2 years 10 months retarded at the start of treatment. At the time of the follow-up their retardation was one month less. Half the children were still unable to pronounce simple words normally within the competence of 12-year-olds.

2. *Spelling*

Spelling was very poor at the start. Three quarters of the group failed:

top, cap, had, let, yes.

The average spelling age was only 9 years in 1952. More than one half was still unable to spell:

ground, lowest, brain, amount, remain,
hoped, dancing, damage, else.

3. *Arithmetic*

Arithmetic quotients hardly changed. The slender grasp of number is best demonstrated by printing the sums failed by more than one half to three quarters of the group at the end of remedial treatment:

$$4\overline{)36}$$

$$\begin{array}{r} 825 \\ -248 \\ \hline \\ \hline \end{array}$$

$$8\overline{)208}$$

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 10 & 4 \\ -\ 4 & 9 \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} \text{s.}\ \ \text{d.} \\ 4\overline{)4\ \ \ 6} \end{array}$$

In short, there was little depth to their learning. The diagnostic and remedial techniques do not appear to have led to any permanent improvements.

D. DISCUSSION OF CHANGES IN ATTAINMENT

The figures in Table VII show that the gains were related to the children's average lines of growth in life age and mental age. A slight positive deflection took place during remedial treatment as shown by the A.Q. The trend, after treatment, is towards the original line. The gains were clearly not related to the frequency of the sessions of remedial treatment for the product moment correlation between the two was +0·16. The relationship between intelligence and gains was low also, being +0·18. The reason may be that remedial teaching *per se* cannot compensate for certain innate and environmental conditions.

CHAPTER 5

THE DESIGN OF THE EXPERIMENT

THE experiment was designed to answer the composite question:

> What are the effects of remedial education upon the intelligence, social maturity, attainments and emotional development of specifically retarded readers of normal intelligence?

This was the original aim. It has also been possible to test the effects of two different places of treatment, and of the sex variable, for two treatment groups were used to strengthen the design and sex representation was balanced. The proportions of boys and girls should not be ignored in small group work as the sexes tend to respond differently to educational stimulation. It is frequently claimed that remedial work leads to improved adjustment as well as attainment, so tests of intelligence, social maturity and of personality were also given, while class teachers made ratings and reports to check the initial test data and to provide independent qualitative descriptions of the children at the end of treatment and during the follow-up. The permanence of changes in attainment was assessed by two follow-up examinations in 1953 and 1954.

The study of related research had shown the need for good experimental design. A control group was essential and analysis of variance was chosen as the statistical technique to test crucial hypotheses. Clearly defined objective criteria were also held in mind when the sampling took place. Social status, the proportion of boys to girls, the ages of the children and the nature of their retardation were attended to carefully. It was hoped that the data would be more definite than that available elsewhere; that the inquiry would show when the treatment started, who was treated, what was done, the magnitude of immediate results and their durability.

There were two treated groups and the control group. One set of children attended the Remedial Centre, the intermediate group was treated at school by peripatetic tutors. The controls continued to receive ordinary schooling. The 60 children were drawn from ten schools, three boys and three girls from each school, and allocated to the three treatment sub-groups by random numbers. Tutors were also assigned at random to the teaching units of four children. Thus each treatment sub-group included 20 children, and all variables were equalised by use of tables of random numbers (Lindquist, 1940). The children attended twice weekly on Tuesday afternoons and Thursday mornings for approximately 75 hours of remedial work during six months. The emphasis was on reading but extra arithmetic was given in the remedial groups held in the schools. Spelling received moderate attention in both treated groups. A description of the teaching methods will be given later (see p. 81f).

The experimental design should lead to a high degree of rigour, particularly as the repetition of the tests allowed the use of a method of covariance analysis suggested by Gourlay (1953).

A. LOCAL BACKGROUND

By arrangement with the local education authorities the Remedial Education Centre served a total school population of approximately 10,250 children. Schools were chosen by *line* sampling; that is, the selected schools lay along a line drawn from the City's hub to the outskirts. Proximity to public transport was also a factor in the choice of schools which fortunately were near two arterial roads. Birmingham may be subdivided into three areas according to social and economic distinctions. These areas are the central wards, the middle ring and the outer ring. The central wards are densely populated with many old back-to-back houses. The middle ring has miles of streets of tunnel-backs built about 50 or 60 years ago, while the outer suburbs are better favoured. Two of the chosen schools served the inner ring, five the middle and two others the municipal estates and private development of the outer ring. One school in Smethwick matched the middle zone of Birmingham. The schools were distributed in this manner because of the strong links between unsatisfactory living conditions and school failure. No one social class was represented. Had all the children been drawn from the City centre, the poorest area, the experimental results would have been gravely biased, owing to the positive relationship between bad overcrowded housing conditions and poor attainments.

The schools were typical of city council schools in general. They were either full to capacity or truly overcrowded: the two Church schools, one in the outer ring and one in the middle ring, being particularly so. The enrolments varied between 200 and 500 children. The overcrowding made it hard to carry out testing and many children had to be examined at the Centre. When the time came for remedial teaching the problem of accommodation for the school remedial groups became acute. The eventual arrangements were far from ideal. The 20 children in the intermediate treatment group worked in medical inspection rooms, offices, staff rooms, old dingy store rooms and the like. The equipment, teaching methods and school furnishings corresponded with elementary school standards in most urban areas. The classrooms were large, airy and clean, fairly cool in summer and never unduly cold in winter. Free play took place in large asphalt yards but use was made of nearby parks, and of the authorities' arrangements for transporting children to playing fields for organised recreation. The relationship between staff and pupils was based on authoritarian principles: it was firm and kindly. The children seemed able to express themselves freely to the adults in charge. Very little use was made of corporal punishment. The teaching methods were orthodox, that is, they were based upon teaching proceeding from the adult to the child who was then exercised by repetition and by drill and stimulated by praise or disapproval in an atmosphere of competition. Teachers were taking advantage of modern ideas. Graded books were available. Children were being streamed into classes for the bright and the dull by the regular application of intelligence and attainment tests and the intensity of competition and difficulty of work were being reduced for the slow learners.

The majority of the teachers knew something about remedial education before the experiment began. Eight of the schools had already worked with the Remedial Education Centre. The two new-comers were in the 'inner ring'. Head teachers had attended annual conferences at the Centre, members of staff had visited exhibitions or had gained some insight into the remedial approach by meeting student-tutors.

The investigator did not have time to estimate the percentage of retardation in the area, but some evidence was obtained by a separate inquiry. The Director of Education for Smethwick kindly provided the test results of 203 children born between 1st September and 30th November 1942, attending 13 schools. Their average age was 9 years 7 months and average I.Q. 97. The social conditions in Smethwick resemble the social standards of large areas of Birmingham so the figures may indicate the attainment standards of schools in the larger authority in 1951-1952. Test results are set out below:

TABLE VIII

DISTRIBUTION OF ADVANCEMENT AND RETARDATION IN THE BASIC SUBJECTS OF CHILDREN IN SMETHWICK

	Years of advancement or retardation							
	−3	−2	−1	0	1	2	3	*Total*
Reading								
Boys	5	18	11	36	17	11	4	102
Girls	4	10	21	41	13	10	2	101
Total %	4·4	13·6	15·5	37·4	14·5	10·2	2·9	(203)
Spelling								
Boys	9	18	19	43	10	2	1	102
Girls	7	14	19	45	11	4	1	101
Total %	7·8	15·5	18·4	40·3	10·2	2·9	0·9	(203)
Arithmetic								
Boys	2	5	22	46	20	6	1	102
Girls	2	13	19	44	14	9	0	101
Total %	1·9	8·7	19·9	43·6	16·5	7·3	0·5	(203)

It will be seen that retardation was found *but so was advancement.* Work by Pidgeon and Yates (1956) has focused attention on this symmetrical distribution of differences. It appears that 'we can . . . admit that both kinds of difference exist and that they may be due to innate as well as environmental sources'.

The emotional atmosphere in the schools was assessed by using a questionnaire from Price (1940). Each head teacher was asked to list children with problem behaviour under one of six headings. They were told that the behaviour should be present to a marked degree.

TABLE IX

EMOTIONAL ATMOSPHERE IN THE SCHOOLS

School code number	*Type of behaviour* 1 %	2 %	3 %	4 %	5 %	6 %
I	0·6	—	3·0	—	—	—
II	0·5	—	4·0	1·0	0·5	2·0
III	3·0	1·5	5·0	5·0	2·5	3·0
IV	0·8	0·3	2·0	3·0	0·3	3·0
V	—	1·0	15·0	3·0	2·0	1·0
VI	0·5	1·0	7·0	2·0	—	2·0
VII	—	—	—	0·5	—	—
VIII	1·5	—	1·5	2·0	—	—
IX	—	—	2·5	1·3	—	1·0
X	—	2·0	10·0	12·0	2·0	2·0

Column headings

1. Children who do not respond to authority.
2. Children who are not on good terms with other children.
3. Children with bad work habits (e.g. poor concentration).
4. Children who show bad general behaviour (e.g. laziness, untruthfulness).
5. Children who are emotionally unstable (e.g. over-excitable).
6. Children who are markedly timid and shy.

The percentages were not high, suggesting that the emotional atmosphere was not unduly restrictive. It seemed to the investigator that each school was doing its utmost within the limitation of staff and teaching space for retarded children. Tests were used to sort children into 'streams'. Four schools had organised small classes for the 'backward'. The head teachers of the other schools were giving help to small groups. The investigator felt that the schools were at least equal to the norm for similar schools in the Midlands.

B. SELECTION OF CHILDREN

The Remedial Education Centre emerged as a co-operative venture to fulfil a need in the schools and to give students reading for the allied diploma courses of psychology of childhood and educational psychology practical training in remedial teaching. Children attended the Centre after they were referred by head teachers or identified by surveys made by students. The records at the Centre showed that referrals alone would not yield the cases necessary for an experiment. Many cases referred were not retarded and some were advanced. The schools were, therefore, either expecting too much from a large number of children or were applying for a larger number of vacancies than necessary, in the hope that some children would be enrolled for treatment. This unreliability of teachers' assessments was shown by survey material at the Centre. The head teachers of 15 schools, amongst which were 6 later to take part in this research, had referred 76 children as retarded. The group then received the Sleight non-verbal test and the Schonell reading comprehension test. The average age was 9 years 11 months, average I.Q. 85, and average reading age 8 years 2 months. In fact 24% was advanced by from one to three years, 51% was working at the mental level and only one quarter was working below mental age. The head teachers had referred dull children who were not 'retarded'. This would not do. The investigator needed a sample of retarded readers of normal intelligence. The schools were visited and the experiment was explained to the head teachers. Criteria for selecting the children were discussed. These were:

1. Parent willing for children to attend Centre (if required).
2. Children near to top age group of junior school.
3. Children of average intelligence (I.Q. range 85-115).
4. Absence of marked physical disabilities.
5. Good attenders with minimum of school transfers.
6. Absence of speech defects.
7. Children should not be maladjusted.
8. Specific retardation in reading.
9. Children must be remaining in the area for present school year.

The aim was to find specifically retarded readers of average intelligence with reasonable school attendance and health records, not so young that retardation might be connected with the transfer from infant to junior departments and who were likely to stay in their present schools during the experiment. The investigator did not wish to treat children with obvious handicaps, frequent absences or changes of school. Nor were victims of unsatisfactory or inadequate teaching desired. The related research has shown that such children improve when helped in their own schools. What was wanted was the hard core of difficulty—the children that the Remedial Centre claimed to treat successfully when ordinary schooling failed. The children, as Peel (1957) says, '*known* to be well behind in reading after months and even years of observation by their teachers'. The maladjusted were eliminated because Schonell (*Times. Ed. Supp.*, 1948) had remarked that the Centre was 'in no sense a Child Guidance Clinic'. It was no part of the aims of the investigator to justify remedial education as supplementary Child Guidance or as a corrective for the faults of mass education.

The children were located in the schools by survey tests carried out by the investigator. These tests showed that sufficient retardation was present in *both* sexes to enable an investigator working single-handed and handicapped by many practical difficulties to find a research sample selected on the basis of numerous and carefully observed criteria.

C. DESCRIPTION OF THE RESEARCH SAMPLE

The sample used in the research was a reasonable copy of the previously treated group of reading cases except that the intelligence level was deliberately restricted to the normal range.

TABLE X

COMPARISON OF RESEARCH CASES WITH PAST CENTRE CASES

	Past Centre cases	*Research sample*
Intelligence quotient	108	98
Sessions attended	29	35
Months attended	13	6
	y. *m.*	*y.* *m.*
Chronological age	9 8	9 8
Initial Schonell R.M.T.	7 11	6 8
Initial Schonell R.C.T.	8 1	7 3
Initial Schonell Spelling T.	7 0	6 8
Initial Schonell M.A.T.	8 6	7 10

The parents were interviewed by the psychiatric social worker. The homes were visited several times. The case data obtained were very like that from the case histories of children that had attended the Centre in the past. The factors affecting both groups have been analysed, and may be seen in the Appendix (pp. 144-5). The children were medically examined before the experiment and the reports from the Principal School Medical Officers indicated that their medical history tended to be more weighted than in a 'good' social group: they were also inferior in height and weight. The medical conditions found in the sample are set out in the Appendix (pp. 142-3).

Retardation has frequently been linked with left-handedness and cerebral dominance, so hand and eye relationships were investigated. This material had not been collected on past Centre cases so comparisons have been made with earlier data from Schonell (1942). The methods of testing used followed his suggestions. Thus, handedness was tested by writing, throwing, hammering and general observation, and eye dominance by asking the children to sight an object through a hole in a piece of cardboard. The results of the tests are compared with Schonell's percentages in Table XI.

TABLE XI

EYE-HAND RELATIONSHIPS (IN PERCENTAGES)

	Research sample, no. 60	*Schonell (backward readers), no. 73*	*Schonell (normals), no. 75*
1. R.H. and R.E.	58	43	60
2. R.H. and L.E.	36	40	25
3. L.H. and L.E.	2	5	4
4. L.H. and R.E.	3	8	3
5. R.H. and either eye	2	3	8
6. L.H. and either eye	0	1	0

The research sample contained fewer left-handed children than either of Schonell's samples and fewer cases where neither eye seemed the dominant. The tendency for more of the retarded children to show 'mixed dominance' by right hand and left eye preference was present in both retarded groups, but this is not conclusive evidence of a relationship between eye-hand preference and retardation. Clark (1957) suggests that many of the past opinions on this linkage have been erroneous.

Finally, the investigator used Rogers' (1942) Component Factor Method of Case Analysis to get an overall view of the research sample and comprehensive ratings on each child. The factors selected by Rogers to portray development are each rated on a seven-point scale in which the lowest rating (−3) represents a state of affairs that interferes with adjustment. Rogers has said that 'the aim is not so much to produce a measurement as to be an aid to an objective type of analytic thinking . . . focusing treatment on those elements which are alterable'. The combined group ratings are set out below:

TABLE XII

PERCENTAGE OF RESEARCH CASES IN EACH RATING CATEGORY
(No. 60)

	−3	−2	−1	0	1	2	3
1. Intelligence	0	2	23	68	7	0	0
2. Physique	0	0	10	63	25	2	0
3. Adjustment	0	12	52	26	10	0	0
4. Social development	2	3	23	68	3	0	0
5. Home (cultural and economic)	0	20	43	30	7	0	0
6. Home atmosphere	0	5	45	47	3	0	0
7. Educational	0	0	2	40	58	0	0

The sample was above average on the modal rating of school experience, average on the modal ratings of intelligence, social maturity and physique, but definitely below average on the modal ratings of the cultural and economic aspects of home life and of emotional factors. The apparently high rating given to physique needs comment. Rogers' rating guide is realistic. The average child according to his rating of physical factors is more typical of the 'majority' family than the middle classes. Therefore, children would be rated average by the examining physician although they may have been below average in the past. For example, height and weight were not expected to be average for age until the +1 rating. The typical well-built child from a good class home would probably be rated as +2. These ratings will be referred to again later. They have been used in this context to indicate that the chief handicaps affecting the research sample apparently derived from sources other than the school.

This concludes the discussion of the experimental plan and of the selection and characteristics of the research sample.

CHAPTER 6

THE RESULTS OF THE EXPERIMENT: (*a*) SCHOLASTIC

THE immediate and long-term effects of remedial education on the school subjects were assessed by tests, by comparisons with the progress made by cases previously treated at the Remedial Education Centre and by reference to teachers' reports.

A. THE IMMEDIATE TESTS

The purpose of this section of the experiment was to find whether the remedial treatment would lead to significant differences between the scores made by the treated groups and by the controls on attainment tests applied immediately at the end of treatment. The investigator followed the normal routine of the Remedial Education Centre very closely. The training of the diploma students was of vital importance. It was essential that the experiment should not prevent their learning the remedial teaching methods and the setting and interpreting of attainment tests. In the beginning the students were only to apply the Schonell diagnostic reading tests but this restriction was too rigorous. It was later agreed that they should test their own groups at the end of treatment with all the tests of attainment except the Gates' diagnostic reading battery and the WISC arithmetic sub-test. These were to be set by the investigator. The tests immediately after treatment were given at the end of March 1952. Supplementary tests followed in June 1952. The investigator gave the Burt and Schonell graded word reading tests and the Schonell mechanical arithmetic test. Students administered the Schonell graded word test and the Schonell silent reading test B. Head teachers gave the Schonell silent reading test A as an additional check on the possible influence of testers on the tests.

Some tests had been given in June 1951 when the sample was finally selected. The Burt graded word test (re-arranged) was the main selection test, but some of the pupils had also completed the Schonell silent reading test A, the Schonell spelling test A and the Schonell mechanical arithmetic test A. A comparison of these scores with the results of the group at the beginning of October 1951 may indicate the progress of these retarded children before the remedial work. The figures below indicate that the gains were less than three months in every subject.

TABLE XIII

AVERAGE SCORES ON SELECTION AND INITIAL TESTS

	Selection		*Initial*		*Gain*
	y.	*m.*	*y.*	*m.*	*months*
Burt R.M.T.	6	6·4	6	8·4	2·0
Schonell R.C.T. (A)	7	1·7	7	3·1	1·4
Schonell Spelling T. (A)	6	8·2	6	7·7	−0·5
Schonell M.A.T. (A)	8	3·6	7	10·0	−5·6

The children's progress had been less than the passing of time immediately before the experiment. The school holidays intervened, however, and when the October tests were given the children were settling down in new classes. Swenson (1949) has shown that unorganised material is soon forgotten so the lost skills may have been a slough of undigested facts in which the children had been drilled. It will be noted that arithmetic was most affected. Burt (1921) has commented that 'arithmetic as practised in the ordinary elementary school may be regarded as little more than a huge bundle of specific habits and memories'. Whatever the reason, it does appear that the examination peak reached by the children at the end of June 1951 was most impermanent.

The experimental course of remedial treatment at the Centre and in the small teaching groups in the schools began in October 1951 and continued until the end of March 1952. A discussion of the effects of this treatment follows:

1. *Reading*

The pilot experiment carried out by the investigator in 1950 had indicated the likelihood of practice transferring to the re-tests. It was decided to apply the Burt and Schonell graded word tests as checks, the Schonell 'My Dog' test scored for accuracy and speed, the Schonell silent reading test A before and after treatment and to set one unfamiliar test after treatment. The Gates diagnostic test battery was chosen for this independent assessment. Later, owing to the very heavy test programme the Burt graded word test and the Schonell test A were omitted from the March examinations. Birch's (1951) thesis had then become available and it seemed that one graded word test would be sufficient and that comprehension tended to follow the scores on the mechanical test. The results of the testing are set out below. The *net* gains were calculated by subtracting the progress of the control group. The rationale for this reduction of the gross scores made by the treated children is that the advances of the controls would have been made without treatment. They represented the effects of growth and error factors.

TABLE XIV

TESTS BEFORE AND AFTER TREATMENT

	I *Centre*		II *School*		III *Controls*	
	y.	*m.*	*y.*	*m.*	*y*	*m.*
October						
Schonell R.M.T.	6	7·9	6	10·9	6	7·8
'My Dog': Accuracy	6	2·4	6	6·0	6	3·9
Speed	6	4·8	6	5·1	6	4·2
March						
Schonell R.M.T.	7	11·1	8	3·4	7	4·1
'My Dog': Accuracy	7	4·8	7	10·2	6	9·9
Speed	7	0·6	7	3·3	6	10·5
Gains	*Gross*	*Net*	*Gross*	*Net*	*Gain*	
	months		*months*		*months*	
Schonell R.M.T.	15·2	6·9	16·5	8·2	8·3	
'My Dog': Accuracy	14·4	8·4	16·2	10·2	6·0	
Speed	7·8	1·5	9·2	2·9	6·3	

Analysis of variance of gains revealed the difference between treated children and controls to be highly significant ($P<1\%$) on the Schonell graded word reading test. The rate of progress of the two treated groups was similar. The children working in far from ideal spare rooms in the schools performed as well as the Centre group. This finding has been confirmed by results at Kingston-upon-Hull (see p. 29). There were no significant differences between the sexes.

The gains in accuracy on the 'My Dog' test corresponded with results in mechanical reading. The improvements in reading speed, however, were not significantly above those made by the controls. The treated children were clearly the more accurate in word perception, while their reading rate was very like that of the controls. It may be asked why the 'My Dog' test was not scored for comprehension. This seemed pointless as it was too difficult for the majority. Each child's reading took so long and there were so many promptings that it would have been impossible to decide whether understanding derived from unaided reading or from promptings. For example, 42 children scored below the accuracy norms at the beginning of treatment and 18 were still below these norms when treatment ceased.

The results of the Gates diagnostic tests are given in Table XV. American norms appear to be more lenient than the English so the scores are higher than the reading ages on the Schonell tests. This has been noticed by Kellmer Pringle and Neale (1957).

TABLE XV

THE GATES DIAGNOSTIC TESTS

	I			II			III	
	Centre			*School*			*Controls*	
	y.	*m.*	*m.**	*y.*	*m.*	*m.**	*y.*	*m.*
1. Oral paragraph rdg.	8	11·2	(5·0)	8	10·9	(4·7)	8	6·2
2. Phrase perception (flash presentation)	9	0·7	(6·2)	8	10·6	(4·1)	8	6·5
3. Word perception (flash presentation)	8	7·1	(3·7)	8	8·6	(5·2)	8	3·4
4. Reversals test	8	7·0	(4·0)	8	8·3	(5·3)	8	3·0
5. Word perception (untimed)	8	8·0	(3·6)	8	9·7	(5·3)	8	4·4
6. Recognition of phonograms	8	3·3	(5·1)	8	4·2	(6·0)	7	10·2

* Excess over control group.

The correlation between the Gates and the Schonell tests was good. The correlation between the repeated Schonell graded word tests was +0·75. The correlations between that test and the Gates untimed word perception test and Gates paragraph reading test were +0·68 and +0·77 respectively. The Gates tests were set up on the initial Schonell graded word test for analysis of variance of gains. Only two differences were significant. These were obtained on the two Gates word perception tests ($P<5\%$) between both treated groups and the controls. It would appear, however, that remedial instruction does lead to differences between treated groups and controls in the recognition of phonograms, absence of reversal tendencies, perception of phrases and the reading of new material arranged in paragraphs. The remedial work increased the immediate accuracy of word perception and there was some transfer to other reading skills. This applies to both groups, the one treated at the Centre and the other in the schools.

The Gates diagnostic tests also gave information on reading speed, on the types of errors made and on the trend of the mispronunciations. Table XVI sets out the average reading speeds of the three groups. Children reading below percentile 25 were rated as *slow* readers, and children below percentile 1 as *very slow*.

TABLE XVI

AVERAGE READING SPEEDS IN SECONDS COMPARED WITH GATES PERCENTILE NORMS

Oral paragraph reading test	I *Centre*	II *School*	III *Controls*
Paragraph 1	26	22	38
Percentile	−25	−25	−1
Paragraph 2	32	32	43
Percentile	−25	−25	−1
Paragraph 3	61	54	81
Percentile	−25	−25	−1
Paragraph 4	90	79	136
Percentile	−1	−25	−1

The treated groups were superior but, as with the 'My Dog' test, chi-square tests revealed that the average reading times of the three groups were not statistically different. The children made the following errors:

TABLE XVII

TYPES OF READING ERRORS ON THE GATES DIAGNOSTIC ORAL READING PARAGRAPH TEST

	I		II		III	
Error type	*Centre*		*School*		*Controls*	
	Total	*Av.*	*Total*	*Av.*	*Total*	*Av.*
Omissions	103	5·1	91	4·5	201	10·0
Additions	10	0·5	8	0·4	12	0·6
Repetition	20	1·0	20	1·0	22	1·1
Full reversals	4	0·2	1	0·1	14	0·7
Part reversals	7	0·3	8	0·4	14	0·7
All reversals	11	0·5	9	0·4	28	1·4
Wrong beginnings	13	0·6	14	0·7	27	1·3
Wrong middles	12	0·6	24	1·2	19	0·9
Wrong endings	62	3·1	51	2·5	65	3·3
Wrong in more than one part	86	4·3	70	4·5	95	4·7
Total mispronunciations	184	9·2	168	8·4	234	11·7
Total errors	317	15·8	287	14·4	467	23·4

The three groups had significantly more omissions and fewer mispronunciations than the test norms, and the percentages of additions and repetitions agreed closely with the norms. The children omitted more words than American children of similar reading level. There was only a minor difference ($P<10\%$) between treated and control groups although the former were better in word attack, but the 60 children were tackling words in a normal manner without undue emphasis either on reversals or errors in beginnings, middles and endings of words according to Gates' norms for mispronunciations. Yet the 20 controls had not worked through the remedial exercises.

The results suggest that remedial reading does produce immediate improvements in word attack, but there is less transfer and generalisation of these skills than has formerly been believed for only in the mechanical aspects of word recognition were treated children markedly superior to the controls. The sex of the children and the places of treatment do not appear to be linked with the gains.

2. *Spelling*

Differences between treated and control groups were so slight at the end of treatment that the spelling tests were discontinued. Scores and gains are set out in Table XVIII.

TABLE XVIII

INITIAL AND FINAL SPELLING TESTS

	I		II		III	
	Centre		*School*		*Controls*	
	y.	*m.*	*y.*	*m.*	*y.*	*m.*
Schonell Spelling A Test 1	6	9·1	6	9·6	6	7·8
Schonell Spelling B Test 2	7	4·4	7	5·0	6	11·2
	Gross	*Net*	*Gross*	*Net*	*Gross*	*Net*
Gains (in months)	7·3	2·7	7·4	2·8	4·6	—

The analysis of variance of gains did not reveal any differences as significant. Remedial education in this experiment did not lead to differences in spelling ability between treated children and controls, between the two different treatments or between the sexes.

3. *Arithmetic*

There were seven tests of arithmetic.

TABLE XIX

INITIAL AND FINAL ARITHMETIC TESTS

	I		II		III	
	Centre		*School*		*Controls*	
	y.	*m.*	*y.*	*m.*	*y.*	*m.*
October 1951						
Schonell diagnostic						
Addition	8	2·1	8	2·8	8	0·6
Subtraction	8	3·1	8	4·7	8	1·5
Multiplication	7	8·8	7	9·9	7	5·9
Division	7	6·5	7	8·3	7	6·3
Schonell mechanical	8	0·4	8	1·0	7	10·3
Schonell problem	7	3·3	7	8·5	7	2·5

TABLE XIX (*Cont.*)

	I		II		III	
	Centre		*School*		*Controls*	
	y.	*m.*	*y.*	*m.*	*y.*	*m.*
March 1952						
Schonell diagnostic						
Addition	9	2·5	9	11·0	8	10·0
Subtraction	9	0·3	9	6·7	8	6·7
Multiplication	8	3·9	8	10·6	7	10·8
Division	8	6·0	8	11·2	7	10·5
Schonell mechanical	8	4·6	9	3·7	8	1·7
Schonell problem	8	1·9	8	8·1	7	8·8
Gains (March–October)	*Gross*	*Net*	*Gross*	*Net*	*Gross*	*Net*
Schonell diagnostic	(*months*)		(*months*)		(*months*)	
Addition	12·4	3·0	20·2	10·8	9·4	
Subtraction	9·2	4·0	14·0	8·8	5·2	
Multiplication	7·1	2·2	12·7	7·8	4·9	
Division	11·5	7·3	14·9	10·7	4·2	
Schonell mechanical	4·2	0·8	14·7	11·3	3·4	
Schonell problem	10·6	5·3	11·6	6·3	5·3	
	z score		*z score*		*z score*	
WISC arith. sub-T. (1)	9·0		8·9		9·3	
WISC arith. sub-T. (2)	9·3		8·7		9·3	
Differences	0·3		−0·2		0·0	

Full analysis of variance of gains was applied to the Schonell mechanical arithmetic test, the addition sub-test of the diagnostic battery and to the WISC arithmetic sub-test. Shortened forms of this analysis were used on the results of the other diagnostic tests. Chi-square was used with the data from the Schonell problem arithmetic test because the distribution of scores was heavily skewed. The floor of this test was too high. Zero scores were made by 32 children on the initial test and 11 still made this score in March 1952.

This statistical treatment of the Schonell diagnostic arithmetic sub-tests and the Schonell mechanical arithmetic test revealed significant differences between *methods* ($P<1\%$). The children in the school group made the superior progress.

Differences between treatment groups and controls approached significance at the 5% level in problem arithmetic but were clearly not significant on the WISC sub-test. It would appear that speed and accuracy in mechanical arithmetic were considerably improved by the remedial work in the small groups in the schools, while some improvement took place in the group at the Remedial Centre, but these skills barely transferred to problem arithmetic even immediately after treatment.

B. REPORTS FROM TEACHERS WHEN TREATMENT ENDED

Reports were made by class teachers on progress and behaviour when the former Centre cases were followed up in July 1952. Similar reports were made on 54 children in the research sample. The staff of one school failed to return six forms.

The children were regular in attendance. This variable had been satisfactorily controlled. The former Centre cases were scattered among stream and class positions. The 54 research cases were also widely scattered although fewer were in A and B classes. A reasonable explanation may be that the average intelligence quotient of the research sample was 98 but the I.Q. of the former Centre cases was 108. The 54 children were distributed as follows:

Class position	*Treated*	*Untreated*	*Totals*
Top half	9	4	13
Bottom half	27	14	41
Totals	36	18	54

There was no significant difference between the class positions of the treated children and the controls at the end of treatment ($P < 5\%$).

The behaviour of the children was studied and rated. There were no significant differences between the treated and control groups on the traits (Highfield, 1951):

1. Self-confidence in failure.
2. Persistence of effort.
3. Concentration.
4. Enterprise.
5. Attitude to adult authority.

The ratings were symmetrically distributed on self-confidence and persistence of effort, and skewed towards the weaker end of the traits concentration and enterprise. Apparently the teachers were experiencing poorer than average application to school work by both treated and control groups at the end of the experiment. The teachers also noted whether the work and behaviour of the children had varied during the treatment period.

TABLE XX

TEACHERS' OPINIONS ON CHANGES IN WORK AND BEHAVIOUR OF 54 CHILDREN BETWEEN OCTOBER 1951 AND MARCH 1952

	Work			*Behaviour*		
	I	II	III	I	II	III
Improved	14	13	11	9	6	4
No change	4	5	7	7	9	13
Deterioration	0	0	0	2	3	1

Chi-square values were 0·55 and 1·22 respectively when treated and control groups were compared ($P < 5\%$). The treated group had shown some improvements in work and behaviour but as statistically similar changes were made by the controls, there appears to be no necessary connexion between remedial teaching and improvement. Even immediately after treatment the teachers did not notice any variations in work or behaviour that could be attributed to the remedial education, notwithstanding the gains on tests of reading and arithmetic.

C. THE LONG-TERM EFFECTS OF TREATMENT

Supplementary tests were given in June 1952 to clarify the immediate test indications and to assess the permanence if any of immediate gains. Follow-up tests were also given in June 1953 and 1954 to all the children who could be traced. Re-testings were confined to reading and mechanical arithmetic, as gains in spelling and problem arithmetic were not significant.

1. *Reading*

The June programme included the Burt graded word test, the Schonell comprehension tests A and B and the Schonell graded word test. The scores and gains are set out below:

TABLE XXI

THE ADDITIONAL INITIAL AND SUPPLEMENTARY TESTS

	I		II		III	
	Centre		*School*		*Controls*	
	y.	*m.*	*y.*	*m.*	*y.*	*m.*
October 1951						
Burt R.M.T.	6	7·7	6	11·3	6	6·6
Schonell R.C.T. (A)	7	3·1	7	3·4	7	2·6
June 1952						
Burt R.M.T.	7	11·7	8	3·2	7	4·6
Schonell R.M.T.	8	2·4	8	3·7	7	6·3
Schonell R.C.T. (A)	8	4·8	8	5·7	7	11·7
Schonell R.C.T. (B)	8	1·7	8	0·6	7	9·7
The Gains	*Gross*	*Net*	*Gross*	*Net*	*Gross*	
(March 1952-June 1952)	(*months*)		(*months*)		(*months*)	
Schonell R.M.T.	3·3	1·1	0·3	−1·9	2·2	
(October 1951-June 1952)						
Burt R.M.T.	16·0	5·8	15·9	5·7	10·2	
Schonell R.M.T.	18·5	8·0	16·8	6·3	10·5	
Schonell R.C.T. (A)	13·7	4·6	14·3	5·2	9·1	
Schonell R.C.T. (B)	10·6	3·5	8·2	1·1	7·1	

The Schonell graded word test showed that the three groups had made only slight progress in mechanical reading between March and June. The differences between treated and control groups for the period between October 1951 and June 1952 were significant ($P < 1\%$) on both the Burt and Schonell tests. Differences between groups were not significant for the comprehension tests nor were there any relationships between gains on any reading tests, places of treatment and sexes. The mean scores on the two silent reading tests favoured the treated groups, but errors of measurement due to the less reliable nature of these tests with backward readers reduced the significance of these differences by increasing the within-groups variances. Thus three months after treatment highly significant gains were still registered in word recognition skills by the treated groups, but differences in reading comprehension, although in favour of the treated groups, were not significant.

Nearly all previous studies have failed to assess the permanence of the effects of remedial treatment so additional tests were given. All told, 45 children were tested in 1953 and 48 in 1954.

TABLE XXII

AVERAGE TEST RESULTS FOR CHILDREN FOLLOWED UP IN 1953 AND 1954

	I		II		III	
	Centre		*School*		*Controls*	
	y.	*m.*	*y.*	*m.*	*y.*	*m.*
Follow-up 1953						
Schonell R.M.T.	8	8·1	9	0·0	8	8·6
Schonell R.C.T. (B)	8	11·4	9	2·3	8	9·4
Follow-up 1954						
Schonell R.M.T.	9	10·6	10	0·8	9	10·3
Schonell R.C.T. (B)	10	1·4	10	9·3	10	4·6

No differences were significant. Thus by June 1953 the treated groups' advances were not statistically different from the progress of the controls. This applied also in 1954. In this investigation the effects of remedial education were not permanent.

The relationship between test scores and treatment may be illustrated by comparing the periodic gains on the tests of mechanical reading with lapse of time. The successive improvements made by the three groups are shown in Table XXIII.

TABLE XXIII

LONG-TERM STUDY OF GAINS IN THE GRADED WORD READING TESTS (IN MONTHS)

Group	*Jun. 51 to Oct. 51*	*Oct. 51 to Mar. 52*	*Mar. 52 to Jun. 52*	*Jun. 52 to Jun. 53*	*Jun. 53 to Jun. 54*	*Total gains*
I (Centre)	1·8	15·2	3·3	5·7	14·5	40·5
II (School)	3·6	16·5	0·3	8·3	12·8	41·5
III (Controls)	1·2	8·3	2·2	14·3	13·7	39·7

The advance of the controls was fairly regular. The two treated groups showed a marked advance during the period of treatment then moved slowly while the controls caught up. Total gains were similar for the three groups. The long-term effects of treatment were negligible.

These data may clarify the changes in the two treated groups and in the group of past Centre cases: the extra individual attention probably increased the memorisation of skills sampled by tests of reading, so that there appeared to be rapid advances when improvements were estimated from tests applied immediately after treatment.

2. *Arithmetic*

Tests of mechanical arithmetic were repeated in June 1952, 1953 and 1954.

TABLE XXIV

SUPPLEMENTARY AND FOLLOW-UP ARITHMETIC TESTS

	I		II		III	
	Centre		*School*		*Controls*	
	y.	*m.*	*y.*	*m.*	*y.*	*m.*
Schonell M.A.T.						
June 1952	8	10·3	9	0·3	8	7·3
June 1953	9	1·8	9	3·5	8	10·3
June 1954	10	3·5	10	4·6	10	0·5

Mechanical arithmetic test sub-group mean scores were similar by June 1952. The group tutored at the Remedial Education Centre and the controls had made equal advances in mechanical arithmetic while the children in the school groups had regressed. The differences between the groups were not significant in any year. The school group had been far superior in March so it was a surprise to find such slight differences between the mechanical arithmetic scores of the two treated groups and the controls. But as in reading comprehension, so in arithmetic. The relationship between test scores, treatment and the passing of time may be illustrated by comparing the periodic gains on the mechanical arithmetic test.

TABLE XXV

LONG-TERM STUDY OF GAINS ON THE SCHONELL MECHANICAL ARITHMETIC TESTS (IN MONTHS)

Group	*Jun. 51 to Oct. 51*	*Oct. 51 to Mar. 52*	*Mar. 52 to Jun. 52*	*Jun. 52 to Jun. 53*	*Jun. 53 to Jun. 54*	*Total gains*
I (Centre)	−4·6	4·2	5·7	3·5	13·7	22·5
II (School)	−4·1	14·7	−3·4	3·2	13·1	23·5
III (Controls)	−4·5	3·4	5·6	3·0	14·2	21·7

The controls and the group treated at the Centre made almost identical advances stage by stage. The school group made a marked gain in test scores during remedial treatment then lost this in three months. Remedial treatment appears to have no long-term effects on mechanical arithmetic skills.

D. REPORTS FROM TEACHERS ON THE LONG-TERM EFFECTS

The research cases were followed up in June 1953 by means of the same forms. Unfortunately reports were not obtained in 1954 owing to practical difficulties. The 1953 reports showed that 15 children had transferred to secondary modern schools during the year. Attendances had been regular. The results were similar to those obtained in 1952 for the children were scattered through streams and classes and there was a wide range in class positions. The observations of the teachers agreed with the test results. Remedial teaching did not make any significant impact upon school work in 1953 and 1954.

E. THE COMPARISON OF THE RESEARCH SAMPLE WITH PAST CENTRE CASES

The immediate and long-term effects of remedial teaching on attainment have been assessed by tests, teachers' reports and ratings. It now remains to compare the progress of the research sample with that of children treated between 1948 and 1951. This will show whether the experiment produced artificial results, for the former cases were treated as individuals with problems and not allocated haphazardly to suit the convenience of an experiment. The comparisons are made by use of indices computed by dividing score differences on attainment tests by the months of treatment.

TABLE XXVI

COMPARISON OF THE PROGRESS OF RESEARCH SAMPLE AND THE PAST CENTRE CASES (1948-51)

	Progress during treatment	*Index*	*Progress after treatment**	*Index*
Schonell Graded Word Reading Test				
Past Centre	23·0 m. in 13 m.	1·77	10·0 m. in 17 m.	0·59
Group I	15·2 m. in 6 m.	2·52	9·0 m. in 15 m.	0·60
Group II	16·5 m. in 6 m.	2·72	8·6 m. in 15 m.	0·57
Group III	8·3 m. in 6 m.	1·38	14·5 m. in 15 m.	0·97
Schonell Spelling Test A				
Past Centre	15·0 m. in 13 m.	1·15	9·0 m. in 17 m.	0·53
Group I	7·3 m. in 6 m.	1·22	not tested	
Group II	7·4 m. in 6 m.	1·23		
Group III	4·6 m. in 6 m.	0·77		
Schonell Mechanical Arithmetic Test				
Past Centre	14·0 m. in 13 m.	1·08	13·0 m. in 17 m.	0·76
Group I	4·2 m. in 6 m.	0·70	9·2 m. in 15 m.	0·61
Group II	14·7 m. in 6 m.	2·45	−0·2 m. in 15 m.	—
Group III	3·4 m. in 6 m.	0·57	8·6 m. in 15 m.	0·57

* Computations on follow-up data of research sample are based upon the differences between final tests and the first follow-up tests in 1953 to make the period approximate to that of the past Centre cases.

It is of great importance to note that the progress of the Centre and school groups resembled the responses made by the past Centre cases. The indices show that the immediate results of the treated children in the research sample were not inferior to the achievements of true Centre cases. The follow-up tests reveal the inverse relationship between gains during and after tuition. The children in the experimental control group, however, continued to learn reading and arithmetic at a rate that was apparently normal for them in their school environment. It does appear that this experiment has revealed what takes place at Remedial Centres. *Children make improvements on attainment tests, but the changes are not permanent. In the long run they only make the same progress as randomly selected controls, and this progress is governed by maturation.*

CHAPTER 7

THE RESULTS OF THE EXPERIMENT: (*b*) GENERAL DEVELOPMENT

THE aim was to find whether remedial education led to changes in intelligence levels, in social competence and in emotional factors by comparing the progress of treated and untreated children.

A. REMEDIAL EDUCATION AND INTELLIGENCE

It is frequently suggested that the intelligence test scores made by educationally retarded children are lowered by weak attainments, by emotional blocking or by a combination of both. Special treatment has been expected to lead to improvements. Records at the Remedial Education Centre gave the Terman-Merrill test scores of 17 children before and after treatment. The average initial and final I.Q.s for this group were 101 and 109, and the range of differences between individual I.Q.s was from 1 to 20 points. The mean difference was significant ($P<1\%$). It would appear that these children had improved in I.Q. and the changes had been attributed to the beneficial effects of remedial treatment. There was, however, no control group.

The Terman-Merrill test was applied to the research sample so that comparisons could be made with the past Centre cases but the Wechsler Intelligence Scale for Children was chosen to assess the effects of remedial education. It was given before and after treatment. The WISC was chosen as it has separate verbal and performance scales. The latter should not be affected by reading retardation. There is a zero difference between the average of verbal and performance quotients in the WISC standardisation sample; but Seashore (1951) has warned that individual discrepancy scores may be large: 'We can expect about one third of a group of random subjects to show a difference between their verbal and performance I.Q.s greater than 12-13 points of I.Q., while in about two thirds of cases the differences will be smaller, from 0 to 12-13 points.' Thus the WISC yields verbal and performance I.Q.s which combine in a full-scale score and follow known patterns in their relationships. The full-scale score also agrees well with the Terman-Merrill test.

The WISC manual of instructions was modified where necessary to suit English conditions after correspondence with Wechsler. The Terman-Merrill test was set in the usual way. Care was taken to alternate the tests to minimise transfer of practice effects. Thus the Terman-Merrill test would be set first to one child and the WISC first to the next. The research sample average Terman-Merrill I.Q. was 97·6. The WISC results follow:

TABLE XXVII

THE WISC RESULTS

	I *Centre*	II *School*	III *Controls*
October 1951			
Full I.Q.	97·8	97·1	98·9
Verbal I.Q.	92·6	91·5	94·6
Performance I.Q.	104·2	103·9	103·8
March 1952			
Full I.Q.	100·9	100·6	100·9
Verbal I.Q.	95·3	94·2	94·7
Performance I.Q.	106·4	107·0	107·6
Differences			
Full I.Q.	3·1	3·5	2·0
Verbal I.Q.	2·7	2·7	0·1
Performance I.Q.	2·2	3·1	4·4

The average scores of the three groups only changed slightly. There were no significant differences between the results obtained by the treated children and the controls, between scores made by the two treated groups or between the sexes. The variations could have occurred by chance. It appears that the remedial treatment did not lead to significant improvements in intelligence quotients.

The WISC data were then analysed to find the trend in the discrepancies between the initial and final test scores. 40% of the children in the research sample had repeated I.Q.s within the limits of *SEm* (that is between 0-3 discrepancy) and the majority of children (65%) showed positive discrepancies. 27% showed a negative discrepancy: 6% showed a discrepancy of zero. There is a greater chance of children scoring higher when re-tested. As the 17 past Centre cases with two Terman-Merrill scores were only 19·1% of all cases treated during the period (1948-51), it is suggested that a significant difference between I.Q.s would have been less evident had the whole group been re-tested. Instead the re-tests were given to a highly selected group. Changes no doubt occur in I.Q.s but they are not connected with remedial education.

B. REMEDIAL EDUCATION AND SOCIAL MATURITY

The aim was to find whether remedial education was associated with significant differences between scores made in a test of social maturity by treated children and controls. The Vineland social maturity scale (1949) gives a broader view of adjustment than an intelligence test. The relationship between remedial education and social development is of more than academic interest. As Wall has stated: 'Without in addition an overriding concept of social maturity, and some criteria for assessing it, education has little point, and indeed becomes a mass of unrelated skills' (Kellmer Pringle, 1950). The Vineland social maturity scale is a series of questions sampling the various social accomplishments that a child can be expected to learn as he grows. Eleanor Schonell (1957) has pointed out that it is strongly biased in the use of items involving physical maturation and co-ordination in relation to social situations. This may make it difficult to apply to the cerebral palsied, but it is not unreasonable to use it with normal children. When Doll (1946) discussed the differentiation of the feeble-minded from the retarded he stressed that the degree of deviation from the average revealed by one test was not necessarily the same as that revealed by others. He recommended that more than one type of test should be applied, and indicated the need to check the practical use made of intelligence by some estimation of social development. The social development scale measures ability to grow socially. This may differ from mental ability.

According to Kellmer Pringle studies have shown marked variability between correlation coefficients based upon intelligence and social competence scores, the range being from +0·80 to +0·34 according to sampling, ability, number of subjects and other variables. The highest correlation was cited by Doll for 436 institutionalised feeble-minded subjects. There is apparently a closer relationship between the measures among the backward, for a correlation of +0·55 was obtained by the investigator in 1953 between the mental and social quotients of 50 children aged from 11 to 15 in a Cornish residential special school. Louttit and Watson (Kellmer Pringle, 1950) obtained a correlation of +0·38 for a sample of normal children between the ages of 6 years and 7 years 3 months. In the present study the correlation between I.Q. and S.Q. was +0·34. This suggests that the two scales sample rather different aspects of personality in the normal population thus confirming the need for some separate assessment of social growth.

During the administration of the Vineland scale the investigator tried to assess the *independence* of each child, asking himself: 'Does the child carry out the task(s) regularly without undue pressure or prompting from others?' The children acted as their own informants. Responses were checked by observation at school or during a home visit. An additional check on the initial administration was provided by comparison of the investigator's material with that elicited by students who used a child interview form. Doll claims high reliability for the study but his figure of $r = +0{\cdot}92$ is based upon 123 mental defectives. In the present study the correlation between the first and second tests was +0·64.

TABLE XXVIII

SCORES ON THE VINELAND SOCIAL MATURITY SCALE

	I		II		III	
	Centre		*School*		*Controls*	
	y.	*m.*	*y.*	*m.*	*y.*	*m.*
Initial	8	11·8	8	9·8	8	11·8
Final	10	0·4	9	10·9	9	11·2
Gains	1	0·6	1	1·1	0	11·4

The group average scores and the improvements are shown above. The research sample average S.Q. at the beginning of treatment was 92, six points lower than the mean I.Q. 98. The sample was low average in social growth prior to the experiment. When the tests were repeated the S.Q. had gained four points, being 96. There had been an average social growth of one year. Statistical analysis did not reveal any significant differences between the treated and control groups, between the two treated groups or between the sexes. Remedial education had not increased social competence over and above the growth shown by the controls. The analysis did reveal a significant difference in the advances made by children grouped according to the schools attended ($P<5\%$). The psychological implications may be shown by placing the average difference for each school group of six children against the school code number and social grade.

TABLE XXIX

VINELAND SCALE: AVERAGE DIFFERENCES FOR SCHOOL GROUPS

School code number	*Social grade*	*Av. difference for six children (months)*
II	B +	17·3
III	B	17·1
V	B +	16·0
VII	B	13·6
X	B	13·0
VIII	C	12·0
VI	B −	10·3
I	B −	9·6
IV	B −	8·3
IX	C	7·9

A firm conclusion would be unsound as the sample is small but there may be a significant relationship between the social origin of the children and the maturation of social ability. The children of poor social grade progress least. The items in the Vineland scale were analysed to sort out the typical variations in the sample during the experimental period. 32 items were found to be discriminative ranging through the eight categories of social behaviour in the scale and spreading from the 5-6-year to the 12-15-year levels. Improvements were greatest in the following skills:

TABLE XXX

ITEMS ON WHICH CHILDREN SHOWED MOST IMPROVEMENT

Item	*Percentage change*	*Task*
74	54	To bath self unassisted.
73	34	Reads on own initiative.
66	33	Tells time to quarter hour.
80	32	Does small remunerative work.
70	25	Combs or brushes hair.
75	23	Cares for self at table.
78	22	Writes occasional short letters.

The changes on items 66, 73 and 78 are supplementary qualitative evidence that the children in the sample had improved in the kind of skills linked with the three R's, but the improvement was general and not confined merely to the treated children. The other items reveal the general maturation of the children. Items 70, 74 and 75 show that these children had grown more self-reliant in personal care and social behaviour. Item 80 implies a broadening of social skills in co-operation with adults.

C. REMEDIAL EDUCATION AND EMOTIONAL GROWTH

This section treats the application of the Rorschach projective test and the Rosenzweig picture-frustration test to the children in the research sample to assess whether there were significant differences between the responses of treated children and controls. The emotional attitudes of the children were also explored.

1. *The Rorschach Test*

This is a well-known test and needs no description here. The administration is now standardised. Klopfer and Kelley (1946) were followed closely in instructions to the subject. Each child was examined individually. It will be recalled that every effort had been made to eliminate children with obvious emotional handicaps when the sample was selected. Therefore, the children cooperated well. Only seven rejected, that is, made no response to cards, and six of these made but one omission. The seventh child missed several cards. He was an exceptional case.

The use of the Rorschach test to probe the effects of treatment on personality was suggested by the work of Carr (1949), Reader (Carr, 1949) and Lord (1950). Another American, Redmount (1948), had used the Rorschach with retarded readers. 24 children, average I.Q. 101, were selected for a six weeks' residential remedial programme. Repeated tests revealed that 39% showed personality improvements, 35% showed no change and 26% were 'adversely affected'.

When the tests were scored it was seen that there were no psychologically meaningful differences between the psychograms. But the perusal did suggest the grouping of children according to the configurations said by Vorhaus (1952) to be associated with reading disability. The significance of differences between treated and untreated children could then be tested by chi-square. Two interesting variations in the personality indicators were also noted. These were examined first.

There was a variation in responses to white spaces ($S\%$) between the treated and the control groups. This was within the limits of random sampling ($P<5\%$). Emphasis upon white spaces is regarded as expressing negativism and feelings of inadequacy. It would appear that eight treated children and nine controls, that is, about one third of the retarded children, had 'tendencies to obstinacy' prior to the experiment and that this persisted throughout unaffected by schooling or by special treatment. The other interesting variation between the groups occurred for the M: Sum C ratio. This is the chief indicator of the way a person controls his emotional life. Hertz (1943) has classified the modes of control as extratensive, ambiequal, constricted and introversive. The first is adjustment by accepting the outside world and more or less fitting oneself to it. The second is a reasonably flexible balance between one's own phantasy life and the demands of the social group at the cost of some spontaneity. The third is control by repression, so this type is not only cold and lacking in spontaneity, but is held back by anxieties. The last refers to the tendency to retreat to the self for security.

There was no significant difference between treated and control groups in the distribution of experience-balance types at the start of the experiment, but a chi-square at the end indicated significance ($P<5\%$). The number of children making adjustment by extratensive means decreased by 50% in the treated groups. The number of constricted children increased. The emphasis on extratensive adjustment was higher in the control group. Now this could be interpreted as indicating that the extra attention to the children's verbal disabilities had upset their adjustment. Peel (1957) has said recently: 'If we insist too much upon attempting to remedy a deficiency in reading attainment that is a consequence of a low level of innate verbal ability, we may indeed make the individuals mentally ill.' It would be possible to generalise that the effects of treatment were inimical, but it is not sound practice to stress the significance of a lone ratio. Movement to control by constriction is common to prepubescents in Western culture according to Beck *et al.* (1951). The movements may have been due to chance growth variations. This is suggested by a comparison of the total changes in the research sample with norms.

TABLE XXXI

COMPARISON OF PERCENTAGES OF CHILDREN IN EACH EXPERIENCE-BALANCE CATEGORY ON THE INITIAL AND FINAL TESTS WITH NORMS FROM BECK *et al.*

	Research sample		
	Test 1 (*C.A.* 9; 8)	*Test* 2 (*C.A.* 10; 5)	*Beck's norms* (*C.A.* 10; 9)
Extratensive	34·9	26·6	27·3
Ambiequal	6·7	10·0	3·2
Constricted	25·0	40·0	54·7
Introversive	33·3	23·4	14·1

The research sample differs chiefly in the percentages of introversive and constricted children at the start of the experiment. When the children were re-tested, their average age was nearer to that of Beck's group and so the distributions were more alike.

The M : Sum C ratio is usually supplemented by the comparison of animal movement (FM) and inanimate movement (m) responses with those to achromatic colour ($Fc+c+C'$), *but no significant differences were found* when this ratio ($FM+m$) : ($Fc+c+C'$) was examined. M : Sum C may also be qualified by the study of the responses made by the children to the last three coloured cards (VIII, IX, X). A study of these responses showed that there was little use of colour in the concept formations, although the productivity of the children was within the normal limits, more than 30% and less than 40%, and the number of responses to Card X was not appreciably more than half. There were no significant differences between the treated and control children. The pattern of the responses suggested that all the retarded readers were experiencing conflicts between their inner promptings and social adjustments and that these conflicts had not been reduced either by treatment or growth.

2. *The Vorhaus Configurations*

Vorhaus (1952) has described four ways of responding to the Rorschach Test. The first configuration is identified by an excess of form responses (F) which suggests a very constricted personality. The stress in the second configuration is on animal movement with diminished colour response, a pattern suggesting constriction with introversion. The balance of human and inanimate movement and colour responses is out of proportion in the third and fourth patterns. They represent personalities that are constricted and introverted but also conforming. A sense of guilt is also said to be present in the fourth configuration. Vorhaus linked these response tendencies with reading disability, but Pugh (1954) found the same configurations associated with the good attainment of Scots children. Vorhaus (1954) agreed that they could be linked with good school progress, but stressed that such children 'were meeting the emotional impact of the pressure to do well in school in ways which were not only causing reading failure, but were making them vulnerable to the stresses and strains of later life'. She had found the four configurations amongst cases of mental illness with good school records.

In the present investigation the children's papers were divided into configurations according to Vorhaus' directions to assess whether treatment had led to differences.

TABLE XXXII

DISTRIBUTION OF CONFIGURATIONS IN RESEARCH SAMPLE ON INITIAL AND FINAL TESTS

Configuration	*Treated Children*		*Controls*	
	Test 1	*Test 2*	*Test 1*	*Test 2*
I	8	6	3	5
II	11	12	5	4
III	7	7	3	1
IV	0	0	1	0
None	14	15	8	10
Totals	40	40	20	20

Chi-square was applied. Both values were below the level of significance, being 0·63 for the initial testing and 2·21 for the final. The remedial treatment was not associated with significant differences between the Rorschach configurations of the children in the treated and untreated groups.

The Rorschach test confirms the teachers' reports. There were no marked differences between the adjustment of the treated children and the controls, and remedial treatment was not connected with the emotional changes.

3. *Rosenzweig Picture-Frustration Test for Children*

The Rorschach test was supplemented by the P-F Test (Rosenzweig *et al.*, 1948). This was set by Miss Baggs, a psychology diploma student. In this test the subject looks at 24 pictures in which one person is frustrating another either by saying something calculated to arouse opposition or by describing a frustrating situation. The subject is asked to say the first thing that comes into his mind. The reply is recorded and later scored according to the direction and type of frustration. The test was given to the 60 retarded readers at the end of treatment and the scores were compared with the test norms. The Group Conformity Ratings (G.C.R.) were subjected to analysis of variance. There was no significant difference between the treated and control groups.

TABLE XXXIII

G.C.R. FOR TREATED AND CONTROL GROUPS

	I *Centre*	II *School*	III *Controls*
Average	59·48	60·20	63·64
S.D.	10·70	10·65	11·75

The two treated groups actually showed less conformity than the controls, but little can be made of this as the score variations could have occurred by chance. The P-F test thus confirms the Rorschach Test. There were no significant differences between treated and untreated children on the aspects of personality sampled by the projective techniques.

CHAPTER 8

FURTHER STUDY OF THE RESEARCH SAMPLE

The sample matched the past Centre cases from council schools. The remaining files at the Centre were checked to see whether that sample represented retarded children in general. It was clear that 25 children from secondary schools and 68 children from higher income groups were affected by the same conditions. It also became clear that lengthy treatment was seldom needed when the main negative condition was inadequate or incorrect schooling. Such cases were referred back to their schools. The children accepted for treatment formed the 'hard core' of disability. The research sample resembled this 'hard core' and, therefore, should be valid for conclusions concerning the effects of remedial education. At the time the investigator had been searching for cases of 'specific reading disability' but it is clear from the study of the sample, and has recently been confirmed by Malmquist (1958), that reading disabilities are not isolated effects, for slow learning pupils deviate negatively from the average in many factors.

A. GROWTH AND LEARNING

The progress of the children was independent of the treatment and seems to have been governed by their individual development. Long-term improvement in reading, for example, was not linked with any single factor, for when gains and intelligence were correlated the result was +0·20, and the correlation between social maturity and gains was +0·09. Therefore, the factors affecting the sample must be studied in interaction. 48 children of the original sample were followed up in June 1954, 27 months after the tests at the end of treatment: all those who made gains of 27 months or over in reading during the period were classed 'successful' and the others 'less successful'. The numbers in these two classes are set out below together with the indices representing gains in unit time.

TABLE XXXIV

PROGRESS OF 48 CHILDREN FOLLOWED UP ON THE SCHONELL GRADED WORD READING TEST

	No.	*Oct. 51 to Mar. 52*	*Mar. 52 to Jun. 54*	*Oct. 51 to Jun. 54*
Successful cases				
Treated	14	2·50	1·17	1·54
Controls	7	1·67	1·36	1·47
Less successful cases				
Treated	18	2·32	0·61	0·97
Controls	9	1·45	0·67	0·86

The proportions of 'successful' cases in treated and control groups are similar, so apparently there is no connexion between eventual progress and remedial treatment. Teachers' reports confirmed the reading test results, for more of the 'successful' children were noted by their teachers as good readers. The ratings obtained by the 'successful' and 'less successful' cases on Rogers (1942) scale were also compared in an attempt to connect attainment with total growth.

TABLE XXXV

PERCENTAGES OF SUCCESSFUL AND LESS SUCCESSFUL CASES UNDER RATINGS MADE BY THE COMPONENT FACTOR METHOD OF CASE ANALYSIS

Factor	*Ratings*							*Chi-square*
Intelligence	−3	−2	−1	0	+1	+2	+3	
Successful	0	3	19	66	12	0	0	1·25
Less successful	0	0	31	69	0	0	0	
Physical condition								
Successful	0	0	6	57	34	3	0	3·53
Less successful	0	0	31	69	0	0	0	10% L.C.
Emotional adjustment								
Successful	0	6	50	25	19	0	0	3·10
Less successful	0	12	75	12	0	0	0	10% L.C.
Social development								
Successful	0	6	12	78	3	0	0	2·23
Less successful	0	0	43	50	6	0	0	20% L.C.
Family economic and cultural influences								
Successful	0	22	34	34	9	0	0	—
Less successful	0	25	44	31	0	0	0	
Emotional atmosphere of home								
Successful	0	0	47	53	0	0	0	—
Less successful	0	6	44	50	0	0	0	

TABLE XXV (*Cont.*)

Factor	*Ratings*							*Chi-*
Educational	−3	−2	−1	0	+1	+2	+3	*square*
Successful	0	0	0	41	59	0	0	—
Less successful	0	0	6	50	44	0	0	

Chi-square is not significant at the 5% level, but in the 'less successful' group there is a trend towards slight inferiority, particularly in physique, emotional adjustment and social development. The remedial education had affected the children less than their continuous total growth.

B. THE RELATIONSHIP BETWEEN GAINS AND INSTRUCTION

The tests given immediately after treatment showed that equal progress was made in mechanical reading whether the children were treated at the Remedial Education Centre or in groups in the schools. Reading comprehension, spelling and problem arithmetic were little altered by the remedial work. Mechanical arithmetic was more rapidly learnt in the school groups than in the Centre or control groups, but it was forgotten quickly. The children worked in groups of four. The tutors were qualified teachers undergoing post-graduate training. One set of tutors worked entirely in the schools and the other set at the Centre. It was not intended that the teaching approaches should differ but variations occurred. The students working at the Centre with its gardens and play spaces devoted more time to activities, while those working in the schools were restricted. The differences extended to the work carried out, the hours given to the basic subjects, and to the content of instruction. The average attendances for the Centre and school groups were 34·9 and 34·8 respectively out of a possible 38 sessions. This variable should not have affected test results. The average time for different aspects of remedial work was as follows:

TABLE XXXVI

AVERAGE TIMES GIVEN TO ASPECTS OF REMEDIAL TREATMENT (IN HOURS)

Group	*Play outdoor*	*Therapy*	*Activities*	*Visits*	*Eng.*	*Arith.*	*Tests*	*Total Time*
I	10	10	10	6	28	9	3	76
II	6	—	10	2	35	20	3	76

Activities took place in the playrooms and the grounds of the Centre to establish friendly relationships and to give the children confidence by success in games, hobbies and in art and crafts. This work occupied the greater part of the first term. Reading and number were introduced gradually by projects linked with the children's experiences or by novel activities which the tutors arranged. One group modelled an Indian Camp. This was followed by word and sentence picture-matching. There was a library at the Centre and the children were encouraged to use it. There was more reading, writing and arithmetic in the second term and this gradually replaced the play. A wide variety of standard texts was used.

The general plan in reading was as follows:

1. The sight vocabulary was based upon children's interests: scrap books, word boxes and diaries were freely used: lists of appropriate words were made for spelling and writing.
2. Words were enriched by activities and experiences: the educational activities that followed the 'therapeutic' play—games, visits, puppetry, drama and mime were used to improve oral expression and to increase the desire to read.
3. Attempts were made to integrate reading and writing with the social growth of the children.
    - (*a*) Tutors read items of general interest.
    - (*b*) Reading was presented through aids and devices, puzzles and games.
    - (*c*) There were stories and new words were illustrated by pictures, and in practical work and art and craft.
    - (*d*) The children's original stories were typed out and read.
    - (*e*) Many books contained graded comprehension exercises.

The remedial arithmetic was guided by diagnostic tests. The number facts were practised from simple, non-language arithmetic texts, in number games and in flash card drill. The tutors combined reading and arithmetic. For example, the children were given boxes containing different lengths of wood. Inside the boxes were lists of questions:

> How long is the yellow piece of wood?
> How long is the green piece of wood?
> How much longer is the green piece of wood?

Pictures of groceries, household goods, clothing, fancy goods, toys, hobbies and sports goods were cut from magazines and pasted on paper to form catalogues. Then the children answered topical questions written on cards:

> It is washing day, go to the grocers and buy a packet of Rinso, a tablet of soap and a packet of starch. Your mother has given you half-a-crown. How much change will you have left?

The tutors in the school groups were faced with poor accommodation and equipment. This limited their work. Diagnostic testing was followed by the remedial suggestions of Schonell and others. 'Therapeutic' play was out of the question and free activities were difficult to organise. There was a tendency for reading drill to be used more than at the Centre, but in the long run the methods in both groups were similar. The exercises were merely applied more quickly in the school group. For example, one tutor wrote:

> Since the pupils in this remedial group were not only very slow but also very inaccurate, the aim during the first term was to encourage reading fluency. Thus the material chosen was simple, enjoyable and interesting. When learning new words the children were asked to imagine that their mind was like a camera taking a photograph of the new word which was written on the blackboard. Then with the eyes closed the word was developed in the 'darkroom'. As the children said the word to themselves, they traced it in the air: then repeated it until the word was known. Finally without looking at the copy, they wrote the word in pencil in the alphabetically compiled picture dictionary. The drawing of a picture added interest to the learning of new words and emphasised the meaning of the word. In later lessons the picture dictionaries were exchanged, and the children enjoyed reading each other's books and testing each other.

Arithmetic was much more formal and mechanical, much time being given to the diagnosis of faults and the working of simple exercises. A girl, for example, who 'could do only those addition sums which required no carrying, and only those subtraction sums requiring no borrowing and paying back' was given 'constant drill'.

It is suggested that the teaching methods and the test scores made by the two treated groups are related. The mechanical aspects of reading, word perception and reading aloud formed an almost equal part of the work in both groups. The approaches were 'mixed'. They included the memorisation of sight words and phonic exercises. Reading and spelling results were, therefore, similar.

The higher scores obtained by the school group in arithmetic may have been due to the extra drill. Immediate gains on tests to find the effects of remedial teaching on the mechanical or 'rote' subjects appear to be related to the exercises worked by the children during treatment; but the subjects with a higher '*g*' content—reading comprehension and problem arithmetic—are less affected

C. THE BACKGROUND TO CHANGE: THE CONDITIONS AFFECTING THE RESEARCH SAMPLE

Lewin (1952) has suggested that the psycho-social field may be treated as a set of interacting conditions. Any particular factor in that field, for example, attainment, may be thought of as affected positively and negatively by driving and restraining forces which operate in different sectors. Lewin's schema simplifies the observation of phenomena even when the background is complex. The diagram opposite illustrates Lewin's framework. In this approach certain assumptions have been made about the strengths and directions of converging forces. Thus half the zero ratings and all the negative ratings have been placed above the line of attainment level, and the lengths of the arrows suggest the approximate strengths of the interacting forces. The positive ratings and the rest of the zero ratings are represented by the arrows below the line. The diagram, therefore, depicts the relative pressures at work in the children's 'life space', and suggests that their development was being handicapped. Any new treatment would only be successful if it reduced the negative conditions in the field. Concentration on the educational sector only would be insufficient. Pressure had been applied there already. A *level* can be raised by increasing pressure or removing handicaps but increased pressure leads to increased tension. The abolition of unnecessary tension should be the aim of education.

D. INTELLIGENCE

The research sample was of average intelligence. Some useful comparisons may be made between the WISC scores of the retarded readers and the WISC standardisation sample. The 'discrepancy score' (Seashore, 1951) is the numerical difference be-

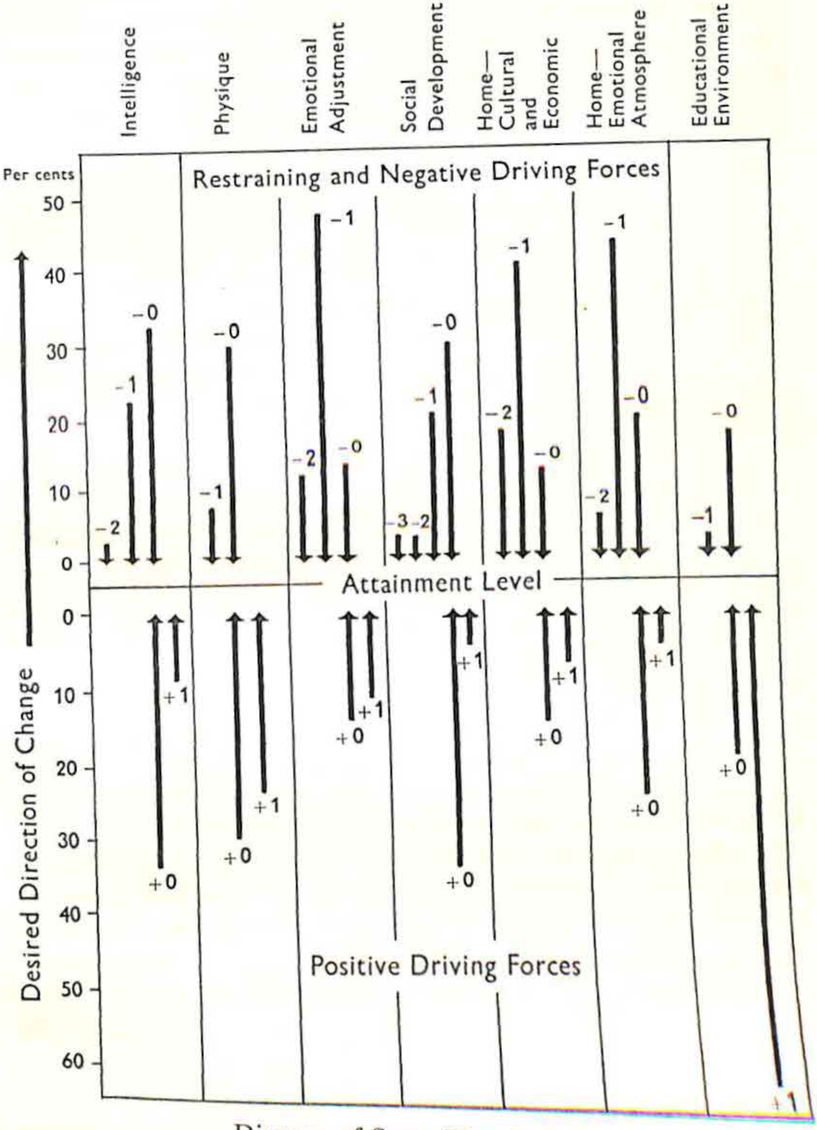

Diagram of Space Plan Analysis

tween a child's verbal I.Q. and his performance I.Q., the latter always being subtracted from the former. Comparison showed that the discrepancy scores were similar in size to those expected in a normal population, but the retarded readers differed markedly from the norms with respect to direction of difference. Performance I.Q.s were superior to the verbal. The average difference was 10·7 points. This might have been due to the children's poor cultural background, but might also point to innate factors. Few of Wechsler's original claims have withstood the test of controlled experiments but there may be some advantage in studying profiles. The average sub-test scores for the research group are given in Table XXXVII.

TABLE XXXVII

THE RESEARCH SAMPLE PROFILE ON THE WISC

Sub-tests	*Standard scores*
Verbal	
Information	8·3
Comprehension	8·5
Similarities	9·8
Vocabulary	8·5
Arithmetic	9·0
Digit span	8·8
Performance	
Picture completion	10·6
Picture arrangement	10·2
Block design	11·6
Object assembly	10·1
Coding	10·1

Graham (1952) obtained a similar profile with retarded readers. The Block Design sub-test standard score of the research sample was high. This suggests accurate visual motor organisation. In the past, for example, Duncan's work (1942), this qualitative difference has been explained by a practical factor, Alexander's *F*, but Vernon (1951) has stated that '*g*' is the major common factor in all but the simplest performance tests. Tests like Koh's Blocks, according to Vernon, may sample the '*k*' spatial factor. He has suggested that '*F*' is probably identical with this latter factor, and it is possible, although there is a great need for further research, that the high Block Design score of the sample may have reflected some special ability.

The Rorschach test also throws light on intelligence. According to theory there is a correspondence between the methods of perception and description of the ink blots and the way that subjects approach mental problems. Interpretation is based upon the manner of approach as shown by the percentages of location categories used, the accuracy of perception and quality of responses, the number of movement responses, the variety of content and the order of location categories. The responses from the research sample will now be compared with data from Mons' (1955) sample of normal British children. The manner of approach, the response to different areas of the cards, departed from the pattern of the normal group. Whole responses (*W*) were fewer, large and small detail responses (*D* and *d*) were more numerous and unusual detail and white space responses (*Dd* and/or *S*) were less. The increase in *D* and *d* responses was particularly noticeable. $D+d\%$ was 74·3 in the research sample. The percentage in the normal group was 59·7; optimally $D+d\%$ should lie between 60 and 70% of *R*. Mons' sample agreed with this criterion indicating normal thinking and the ability to handle the 'routine problems of daily life'. The higher $D+d\%$ in the research sample suggests inflexible and reproductive thinking. Retarded children experience strain. Constant failure to learn in the early years at school may permanently damage mental processes. Plant (1950) has noted this.

> Then we feel very definitely that there is a special problem involving that unfortunate group with I.Q.s *just a little below* the average for their community. The difficulty is that the child's ability is not low enough to set him apart, but is low enough to mean that he must be 'forever on his toes' to keep up with his group. Here we do not get the reactions of inadequacy so often as the restless tense pictures of the fatigued child

The order of *W*, *D* and *d* responses also indicates the quality and use being made of intelligence. The emphasis was upon *orderly* succession implying good mental flexibility, but there was a bias towards stereotypy as 28·4% of children fell in the *rigid* category. This type of response 'presupposes a certain intellectual capacity [but] it does not make for high efficiency, except for very limited purposes'. Such cases are without spontaneity and lack originality.

Movement responses and creativity are closely linked. The *M* responses of the research sample were lower than those of the normal group, being $1{\cdot}67 < 2{\cdot}20$. They were very ordinary responses too and this may be shown by comparing them with the rank order of responses given by Klopfer and Kelley (1946).

TABLE XXXVIII

TYPES OF MOVEMENT RESPONSES IN PERCENTAGES

Card		*Research sample* %	*Rank order from Klopfer and Kelley*
III	(men bending)	24	1
IX	(clowns)	16	3
I	(side figures)	13	5
IV	(giant)	10	6
VI	(figures)	10	8
II	(clowns)	9	3
VII	(dancing girls)	8	3
X	(pink figures)	5	9
VIII	(animals)	3	10
V	(bat)	2	7

The similarity of *M* responses is further evidence of the non-creative mentality of the sample.

The form accuracy ($F+\%$) was good. This suggests that the level of mental functioning could have been higher than it was. Finally the content may be considered under the headings, Animal, Human and Popular responses. Klopfer and Kelley say that subjects of good mentality should not produce more than 50% of animal responses. The average of the research sample, 55·2%, was only a little over this figure. The children also placed more than 25% of their responses outside the Human (*H*) and Animal (*A*) categories, so their scores were only a little higher than Mons' norms. This suggests that the range of interests of the retarded readers was within the range expected for children of their mental level. The number of popular responses given by the research sample also agreed well with the '*P*' in Mons' group (Research = 5·05, Mons = 4·77). The use of five or more popular responses is believed to ensure that the subjects possess the capacities and interests to think along the same lines as the rest of the community.

The Rorschach test, therefore, indicates that the research sample was not a mentally dull group but there was a lack of spontaneity, reproductive rather than original thinking, and a reliance upon the commonplace. Inner life was only sufficient for the recognition of everyday items in a rather narrow range of response categories. The children were unable to express their creative potential. Their mental attitudes may have been stunted by early home and school experiences which damped their imagination and curiosity.

The constancy with which the above indications appeared in the Rorschach tests also suggests that the mental attitudes were firmly established before the remedial work began. The children could hardly be expected to be changed by amateur therapy and brief coaching.

E. SOCIAL COMPETENCE

The content of the responses to the Vineland social maturity scale indicates the values and standards of the children. Their interests were clearly non-academic. They enjoyed outdoor play. Some played in the streets and parks almost every night. 35 children went to the cinema once or more weekly and 13 were members of clubs or attended dancing classes. 13 had indoor hobbies, but they were very simple activities, collecting stamps, cards and the like. Only 26 children out of the 60 in the sample enjoyed reading out of school.

The levels of economic and cultural aspirations in the group may be deduced from the choice of next schools, of future jobs and the imaginative preference of what each child would like to be. The interviews suggested that the values of the group were in harmony with the family backgrounds and the probable future levels of educational attainment. Thus 51 children expressed preference for secondary modern schools, eight for secondary grammar and only one for technical school. The boys' job choices favoured factory employment, coal mining, bus driving, the Fire Service, armed Forces and trade: the girls were interested in cookery, work in shops and the teaching of dancing. In their imaginative preferences of what they would most like to be of anyone in the world the boys selected Buffalo Bill, Dick Barton, various film actors, Sir Winston Churchill and the King. The girls favoured film actresses and membership of the Royal Family, or more vaguely 'a great dancer, a ballet star, a pretty girl'. These children were reflecting the vital and vicarious experiences of their surroundings without apparent dissatisfaction. They were learning to live without thinking and to seek glamour in their fantasy lives rather than in their actual lives. It is, therefore, suggested that (*a*) the urge for success in school was weakened by complacent acceptance of the social, educational and cultural aspirations of the parents, their social group and neighbourhood influences; and (*b*) these children were escaping from their dull lives in fantasy.

F. PHYSICAL CONDITION

The principal diseases and defects are listed in the Appendix (p. 142). The medical ratings indicated that the majority of the children were average on Rogers' scale. This rating implies only moderate fitness. Some children in this category had been below average in the past and others had slight handicaps. Heights and weights tended to be below normal. Fitness and home circumstances were related. The most seriously affected children lived in the central wards. Pneumonia, otorrhoea, prematurity and poor nutrition occurred in this group. Brothers and sisters had also died of malnutrition or meningitis. MacKeith and O'Neill (1952) have stated that the common stress causes of repeated absence from school are abdominal pains and headaches. The incidence of these conditions was slight in the research sample but this would be expected. Poor attenders and children with noticeable emotional tension had been eliminated. The general condition of the selected group appeared to be one of *fatigue* rather than of illness. It was shown by tests, ratings and an analysis of case histories that the group lacked many of the foundations for secure personal adjustment. Vitality and physical resistance had been lowered. The children in the research sample were slightly less mature in physique than normal for their age and status groups, and their health histories were rather weighted. Physique and health, therefore, acted as forces lowering the levels of school work.

G. EMOTIONAL ADJUSTMENT

The investigator rated 12% of the group as possessing personalities unlikely to respond to treatment, 52% as below average with mild tension, 27% as average with only occasional upsets and 10% as being free from anxiety. Teachers had noted behaviour in school. A list of typical behaviour problems was used, based on Wickman (1928). The chief difficulties were 'lack of interest in school work', and 'slowness of reaction'. Thus the lack of spontaneity and constriction indicated by the Rorschach test had been noticed by the teachers.

The emotional state of the research sample may be clarified by the Rorschach test. The ratio of whole responses to human movement ($W : M$) was 4·33 : 1·60 in the research group. This agrees with Beck's (1951) norms. The agreement suggests that although the children were retarded in school work their cognitive functioning was in balance with their inner life. This would explain the failure of treatment to release additional mental energy. As far as the investigator could tell in this group there was not 'the intellectual power in latent form waiting to be gradually released by appropriate measures', said by Schonell (1942) to be characteristic of retarded pupils.

A detailed examination of human and inanimate movement (M and FM) in the research sample and in Mons' (1955) normal group, revealed a significant difference ($P < 1\%$) between the two. The number of FM responses was excessive in the research sample. Colm (1948) has noted that children who give a large number of FM responses have grown up under strain. Perhaps the research group, handicapped by physique, home and learning problems, had attempted to fulfil adult expectations beyond its power. The Form-Colour (FC), Colour-Form (CF) and Colour (C) responses suggest that these retarded readers were lacking in vivacity and spontaneity in their social contacts. They would be suppressed rather than forthcoming in adult company. The condition of the group seemed deeper than the type of free floating anxiety that responds to reassurance and brief therapy. There was little inanimate movement (m) in the responses and the children did not show anxiety by their reactions to achromatic cards. Probably the children had been very anxious when their first steps in reading faltered, and this anxiety left the scars that the Rorschach test revealed.

H. HOME CONDITIONS

The ratings of the economic, cultural and emotional aspects of home life indicated that in the research sample environmental conditions were generally poor. Economic conditions were very inferior in 20% of cases: 43% were better economically but there ing to live without thinking and to seek glamour in their fantasy lives rather than in their actual lives. It is, therefore, suggested that (*a*) the urge for success in school was weakened by complacent acceptance of the social, educational and cultural aspirations of the parents, their social group and neighbourhood influences; and (*b*) these children were escaping from their dull lives in fantasy.

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H. HOME CONDITIONS

The ratings of the economic, cultural and emotional aspects of home life indicated that in the research sample environmental conditions were generally poor. Economic conditions were very inferior in 20% of cases: 43% were better economically but there was little cultural stimulation. Material and cultural home conditions were good only in 7% of cases. Ratings of emotional factors were low for half the sample. The children had experienced stress because of the physical or mental health of parents, housing difficulties, the presence of relatives in the homes and the general hindrances of below average economic circumstances. The emotional atmosphere was better in the other homes. The interplay of home conditions and of school failure requires separate investigation, but in this research the adverse factors were the well-known restraining forces—the economic, cultural, physical and emotional conditions which are so difficult to untangle or modify.

I. SCHOOL CONDITIONS

Ratings were mostly positive. The Rogers' scale reflects an overall opinion on continuity of schooling, regularity of attendance and on the amount and quality of teaching. There were only slight differences between schools. Emotional atmosphere, teaching methods and organisation were similar. School meals and playground activities were well supervised. The schools were orthodox. Learning was stimulated by rewards, punishments and mild competition. Much of the work in the three R's was repetitive and mechanical. But the schools were not dead and formal. The school day included opportunities for spontaneous expression in dramatic work, art, handwork and games. The teachers were very interested and their judgments were sympathetic in most cases. Stocks of books were being built up and objective tests had been used to form relatively homogeneous teaching groups. The staffs were familiar with Schonell's books and methods. Remedial steps had been taken with many of the children selected for the experiment. Attempts to put these remedial methods into practice were obvious in both infant and junior departments. There had been daily reading practice, word building, apparatus work, the making of scrap books and picture dictionaries and the blending of oral and written work by the development of composition from picture sentences. Thus each child was being given the best possible help within the existing organisation of each school. The research group had been affected by two constant factors: (*a*) post-war shortages, and (*b*) persistent overcrowding in large classes.

The children were interviewed to find out how they liked school. They showed their own preferences for the various subjects.

TABLE XXXIX

RANK ORDER OF SUBJECTS LIKED OR DISLIKED

Subjects liked	%	*Subjects disliked*	%
Arithmetic	70	Reading	30
Art and craft	57	Spelling	25
Writing	53	Writing	17
Physical education	32	Arithmetic	10
Reading	23	Composition	7
History	8	Music	7
Geography	7	Geography	3
Music	7	Physical education	2
Spelling	2	History	2
Scripture	2	Art and craft	2

Each child had three choices and the percentages above are based upon the number of times a subject was mentioned. Reading was neither actively liked nor disliked. Reading contrasts markedly with arithmetic, the basic subject in which the children saw themselves to be 'high achievers'. Yet events were to prove that in the long run the children made more progress in reading than arithmetic! More than two thirds of the children stated that they liked school, and more than half were satisfied with their present levels of work. 36 children said that their parents were satisfied with their work, 24 knew their parents were anxious and 16 of this latter group were already doing work at home to please their parents.

Social researches frequently neglect the changing background against which research takes place. This study commenced in 1951 and continued until 1954. The reading levels in the schools were constantly improving as the effects of the 1939 war diminished. This would be an unseen variable increasing the reading levels of treated and control groups alike. Thus the restraining and driving forces in the school situation would be difficult to disentangle without a separate investigation, but it is clear that the children's failure was not due to lack of effort on the part of the teachers or to indifference on the part of all parents. The schools, furthermore, were already exerting strong pressure to raise attainment levels before the experiment began. Some of the children in the research sample had already been given extra help both in their schools and in their homes.

J. DIFFICULTIES OF INTERPRETATION

The problems of interpretation may be illustrated by a case study. A force which under some conditions may seem to be a valuable incentive may under others become an induced force at variance with the needs of children and, therefore, negative in effect. It is not really known, for example, whether the teaching of reading by the use of simple apparatus, graded vocabulary and progressive readers with or without phonics, is the right path to literacy. The remedial approach may be making children illiterate readers by setting up psychological resistances. Lewin (1952) has stated:

> Mere force plays a considerable role in all education . . . to make a person behave in a way which he would resent, a step-by-step method is frequently applied—a procedure ingeniously employed by Hitler. The individual is pushed into a situation which is not sufficiently different from the previous one to create great resistance. After he has adapted himself the next step is taken.

Peel (1957) has suggested that some remedial work may be undesirable for we should be 'finding the type of education best suited to these individuals', just as one accepts different abilities at the grammar school level. Let us examine one case.

> P.G., aged 8 years 3 months, I.Q. 124, was referred for general retardation. She attended the Centre for one and a half years. Test results showed that she was always working below her mental age. She was in the bottom quarter of an A stream in June 1952, and below average in trait ratings.
>
> When P.G. commenced attending the Centre her parents were not worrying about her school progress. Her case was reviewed in October 1950 because her head teacher had reported that the parents wished attendance at the Centre to cease. The psychiatric social worker also stated that the parents were worried because the child had dropped four places in her class list, and her arithmetic report was far from satisfactory.
>
> The case file revealed that parental opinion changed during the period of remedial work from lack of interest to over-anxiety concerning progress in school. The girl's attitudes also changed from enthusiasm to resentment. For example, in November 1950 her tutor wrote: 'Appeared to be somewhat tired and resentful. Mentioned again about only coming once a month.'

This may well be a case where remedial work did more harm than good. When the investigator examined this child in 1951 the opinion was formed that her personality was very constricted and that her adjustment was superficial. There did not appear to be any essential change in personality during the course of treatment. There is a great need for longitudinal studies of children who have received remedial assistance for only they can show the relationship between teaching methods, adult attitudes and child growth.

PART III

RE-EXAMINATION OF THE CONCEPT OF REMEDIAL EDUCATION

WHEN the Remedial Education Centre of the University of Birmingham Institute of Education was officially opened in October 1948, Mr G. N. Fleming of the Ministry of Education referred to the study of the retarded child as 'pioneer work at university level in a field previously dealt with only incidentally'. The investigator has been constantly reminded of these words. In 1950, before the study of previous research and the experiment, the effects of remedial teaching had seemed to him to be so obviously beneficial as to hardly need the support of further experimental proof. But research is necessary. The alternative facing the investigator has been to conclude by stressing the need for a repetition of the experiment on a larger scale by organisations such as the National Foundation for Educational Research and the Scottish Council for Research in Education, or to accept the challenge of the experimental results. He has chosen the latter course, and Part III represents an attempt to contribute to the assessment of the remedial approach used in the experiment. This evaluation will suggest that the remedial work may be likened to an overlapping teaching situation without essential change and, therefore, that it brought no useful positive forces into the pupils' lives.

CHAPTER 9

METHODS

METHODS of teaching vary with the subjects. It is now recognised, for example, that art 'will lose its purpose' when taught formally. Yet the emphasis is still upon direct and rather mechanical teaching in the basic subjects. The authors of the Nottinghamshire Education Committee report (1955) state that children do not teach others to read, 'they usually just tell them the words'. Spelling too 'has to be taught'. It is founded on the word list. Similarly arithmetic is dependent upon drill. The Glasgow Child Guidance Report of 1955 makes clear the belief that 'basic bonds' have to be formed. These procedures appear to be the 'good methods adopted in any successful teaching', and are certainly the fundamentals of the remedial approach in reading, spelling and arithmetic. Teaching methods still have the characteristics of sense training. Children are supposed to learn by eye, by ear and by touch.

A. READING AND SPELLING

It is believed that weaknesses in visual or auditory perception have led to failure. Therefore, diagnostic tests check these perceptual lacks and remedial teaching methods are linked closely with the symptoms isolated by the tests. But in the experiment the data from Gates' tests suggest that the only differences shown by the experimental group from norms based upon children of the same reading level were in speed of oral reading and the tendency to omit more words. The performance of a reader of average level in the group is shown by the excerpt from Gates' test in the appendix (pp. 139-41). This passage shows that the errors were either omissions or substitutions, the perseveration of a previous concept (boy—dog's, 1.2), conceptual associations (barked—the dog's body, 1.9) or perceptual similarities (this—his, 1.9). These are errors which suggest that the children were unacquainted with the vocabulary and lacked the level of thinking needed to appreciate the logical development of the story. Errors and omissions, therefore, increased as the text became more difficult and the context gave fewer cues.

Inter-test correlations show the close relationship between all linguistic skills.

TABLE XL

CORRELATIONS BETWEEN TESTS OF LINGUISTIC SKILLS

	r
Schonell R.M.T. and Schonell Spelling Test	0·72
Schonell R.M.T. and Schonell R.C.T. (A)	0·72
Schonell R.M.T. and Gates Oral Paragraphs	0·77
Schonell R.M.T. and Gates Word Perception (untimed)	0·68
Gates Oral Paragraphs and Gates Phrase Perception	0·84
Gates Oral Paragraphs and Gates Word Perception	0·84
Gates Oral Paragraphs and Gates Reversals	0·75
Gates Oral Paragraphs and Gates Word Perception	0·78
Gates Oral Paragraphs and Gates Phonograms	0·57

The correlations are positive and high. Vernon (1951) has said, 'There is yet no justification for subdividing oral reading into speed versus accuracy factors, or into ability with regular phonic and irregular words, or into pronunciation of isolated words versus complete sentences, though these are all possibilities.' The high correlations suggest that the functions tapped by the tests are closely related, and conceptual rather than perceptual. The remedial approach may be concentrating attention upon symptoms: faults caused by the teaching of reading to children with inadequate vocabulary and immature development. The reading 'disability' may be no more than an uneven verbal growth pattern, and the 'errors' lawful expressions of a reading gradient. Malmquist's (1958) investigation has disposed of 'word blindness' by showing that all the various alleged symptoms of this 'disease' entity were found in readers at all levels, although to a greater extent among subnormal readers. This is a confirmation of the data from the present investigation. Reading develops from speech. Schonell (1948) understood this, for he noted that 'research shows that it is fatal to "push" young children along in their initial stages of learning to read particularly if there have not been activities to create a functional language background beforehand'. Yet remedial teachers have not put this advice into practice for Irvine, Lewis and Howard (1957) have commented that 'quite apart from the fact that the basic necessity for an adequate speaking vocabulary is not always recognised by remedial teachers, they sometimes fail to take into account something that is known to every child psychotherapist. This is that learning to read has many psychological implications for the child.' School people in general are in such feverish haste to get the child to read that they forget to let him handle things and talk about them. Children meet for little more than drill according to the 'teaching method' in vogue. Thus in Kingston-upon-Hull (*Education*, 1957) 'word-structure and book reading' were stressed, not child-centred activities, and in Swansea (*Education*, 1957): 'Elaborate apparatus was unnecessary, the children being taught through a well-graded series of books, and progress tests were used to control the children's advance from book to book.' Mechanical remedial teaching has followed mechanical diagnosis. Betts' (1956) comments on symptom diagnosis are relevant here:

> This use of inadequate reading tests in turn has a serious implication. Teachers, awed by a printed test, 'buy' the scores at their face value. For example a fifth-grade child making a grade score of 3·7 in a certain test may not be able to pronounce the words in a pre-primer or primer. Yet he is issued a third reader and finds himself frustrated. He cannot pronounce the words: therefore the teacher decides that he needs a heavy dosage of phonics. Or he struggles through a word by word pronunciation performance with the teacher's help, or he is asked to draw lines between phrases to overcome word-by-word reading. Or he cannot read well enough to follow directions, so he is given exercises with this label. In short, the teacher does not get at the cause of the learner's frustration: instead she works on symptoms. Working on symptoms is one of the causes of the present recurrent phonics fad. It is one of the causes of other fads such as silent reading, non-oral approach to reading, corrective reading, remedial reading, etc.

Many of the errors diagnosed in the basic subjects are probably due to children being taught to 'read' and 'number' rather than being given freedom to learn. The children in the research sample had started *formal* reading between 5 and 6 years of age. They might have been more gainfully employed developing vocabulary by handling things and talking about them.

Another point arises from a recent article. It is almost universal practice to state the reading level of a retarded child on the basis of a graded word test. Kellmer Pringle and Neale (1957) have investigated the crude relationships between the Gates picture test and the Schonell graded word reading test. They found that 'most of the 180 children attempted to do the first two pages (containing 32 items)' of the Gates test although 'quite a number would not try any word beyond the first three lines (15 words) of the Schonell test'.

> For example, an educationally retarded boy of average intelligence (I.Q. 95) managed only 12 words on Schonell's test and refused to try any others. On the Gates test he scored correctly 28 words and attempted another six.

They believed this to be due to the easier items and greater attractiveness of the Gates test. It made the children interested and they persevered. This may explain the rapidity of progress coincident with treatment. Many children may have known the work all the time but were unwilling to persevere until familiar with the test situation. The transfer of training from the remedial exercises to the tests would enhance this familiarity.

Spelling too has been affected by the emphasis upon perceptual functions. Schonell's (1942) suggestions are for skilfully manipulated word drill. The remedial exercises are related to some diagnosed differences in visual and auditory perception. Yet Schonell has said of his own investigations that 'the types were not absolutely distinct and clear cut'. His case studies of 'types' of spellers tend to suggest that the perceptual causes were really only symptoms of overriding personality and environmental problems, and were related to the teaching to which the child had been exposed.

> Methods of teaching reading and spelling, particularly with regard to sight drills and phonic drills of words, influenced in some way the relative emphasis placed by these pupils on visual or auditory reproduction in their spelling.

An analysis of the spelling test papers of the research sample proved that one and the same child makes all types of errors and these errors are not corrected by remedial drill. The errors persist until the words acquire meaning for the child, that is, they match his conceptual level.

Spelling is more than a perceptual process. It is a conceptual function involving recall and reproduction and ultimately depends upon the child's level of vocabulary and on his ability to think in his own language. The errors made by the children, treated or controls, included reversals of letters, wrong beginnings, middles and endings of words and words completely wrong. These mistakes could be ascribed to 'weak visualisation' or 'poor auditory perception' but it seems more important that the tendency to error increased when the words moved above the level of the children's experiences.

As in the case of reading, it would be more exact to look upon the errors as the children's attempts to order dimly understood processes. The test words were dictated in sentences to give them meaning, yet the simple homonyms sun—son, four—for, write—right, were confused. The restraining force affecting orthography and reading may have been the weakness of the children's insight into symbols and their denotations. The error analysis used in remedial work may be a barrier to the true understanding of children's growth in vocabulary.

The article by Bartlet and Shapiro referred to earlier may illustrate the effects of wrong treatment. Tom's reading was tackled intensively with reading machines. Tom *read* through the first eight books of the 'Adventures in Reading' series. Yet at the end of treatment he apparently could not read short sentences fluently! The scores on the 'My Dog' test were barely above the norms for accuracy and were below the norms for speed.

It would seem that the phonic analysis, syllabification and other techniques for unlocking words were taught long before the children in the research sample were ready to benefit. Longitudinal studies of the growth of spelling ability are most necessary. One case is summarised below to illustrate the failure of one boy to respond to tutoring:

K.B. aged 10 years, I.Q. 109, attended the Remedial Education Centre for one year. He made 21 attendances and his spelling age improved by one year from an initial score of 7 years 5 months. But, as the copy of his final test paper showed, this gain was made up of six two-, three- and four-letter words, and words that he had spelt correctly when he started treatment were failed. A follow-up test given in June 1952 showed that he had regressed. In 2 years 7 months, which included one year of remedial work, he advanced by only three months in spelling.

Remedial education did not lead to marked or permanent gains in his case.

B. ARITHMETIC

The diagnosis and treatment of retardation in arithmetic is particularly linked with the formation of bonds or habits. 'One cannot,' states a Director of Education (*Times Ed. Supp.*, 1956), 'discuss the multiplication table. This can only be learned until the response is automatic.' Addition, multiplication, subtraction and division have been looked upon as associations acquired by exercise rather than as symbolic relationships in which numbers are substituted for extended masses or quantities for ease of computation. But although scores on tests given immediately after treatment in this research improved, the changes were not permanent. Diagnostic arithmetic tests may be useful to assess the developmental levels of children but their use appears to be unsound when confined to identifying bonds to be hammered home by repetition. The analysis of test papers has suggested that there were close relationships between general and specific skills. The application of chi-square to the distributions of scores on the Schonell mechanical arithmetic test and the first four parts of the Schonell diagnostic arithmetic tests did not reveal significant differences except for subtraction ($P > 5\%$). The children's answers to the questions in the mechanical and problem arithmetic tests also indicated that the remedial exercises had failed to eradicate faulty work habits. Accuracy was no greater. The sums failed by more than half of the treated children at the end of treatment are set out below. These children were of average intelligence in the top age group of the junior school:

10. Divide:

$36 \div 4 =$

12. Divide:

$6\overline{)102}$

15. Multiply:

$$\begin{array}{r} 357 \\ \times \quad 8 \\ \hline \\ \hline \end{array}$$

16. Divide:

$8\overline{)208}$

18. Add:

$$\begin{array}{rl} \text{s.} & \text{d.} \\ 2 & 11\frac{3}{4} \\ & 4\frac{3}{4} \\ 1 & 3\frac{1}{2} \\ 3 & 9\frac{1}{2} \\ \hline \\ \hline \end{array}$$

19. Subtract:

$$\begin{array}{rr} \text{s.} & \text{d.} \\ 10 & 4 \\ -\ 4 & 9 \\ \hline \\ \hline \end{array}$$

In problem arithmetic the following sums were also failed by more than half the children at the end of treatment:

8. Ten boys are given two pennies each. How many shillings and pence is this?
11. I have 2 half-crowns, 3 shillings, 4 sixpences and 2 threepences. How much money have I altogether?
12. There are 36 girls in our class. They each have 6 books. How many books have they altogether?
13. Mother gave her 4 children 5s. to share among themselves. Each child was to get the same. How much did each get?
14. I spend 1s. 6½d. on a book, 5½d. on a pencil, and 2d. on a pen. How much have I left from 4s.?
15. I buy 21 buns at 7 for 1s. How much will they cost?

There was little improvement even though diagnostic approaches had been used. The analysis of the test papers also showed why there were negligible differences between the three groups in the WISC arithmetic sub-test. The failure of the written arithmetic skills to transfer seems due to (*a*) inability to use props as the questions were oral, (*b*) strict time limits for each question, and (*c*) the progression of item difficulty which is more rapid in the WISC. This chapter may serve to give a qualitative setting to the results set out in Part II. Neither the treated nor the control children were working at the levels expected on the mental age criterion. The remedial instruction had been an overlapping situation without any essential changes. Both teaching methods and the guiding philosophy were similar to ordinary school practice.

It could hardly have been otherwise. A. I. Gates was a student of Thorndike and a leading defender of Thorndike's educational psychology. The majority of remedial workers have been influenced by Gates. His tests have been copied by Schonell and more recently by Neale (1958) and through them the connexionist learning theory is being introduced to teachers. This educational doctrine affirms that the *bonds* must be identified, then formed or broken, errors must be diagnosed so that they will not be repeated, and the learner must be shown how to respond, put through the correct reaction and rewarded. In practice this doctrine leads to the imposition of repeated tasks upon children before the tasks have any interest or meaning:

> The children who are more retarded than this—with reading ages between 5 and 6 years—will be still in the mid-primer stage and will need someone continually at their elbow prompting as they go. . . . A child at this stage *to derive benefit from a reading lesson* should read aloud at least five or six times an hour before a prompting supervisor in addition to hearing others read. He should feel all the time that, 'Soon it will be my turn and I must be ready.' If this is not possible his attention will wander from the *meaningless symbols* and he will either seek diversion round him or lapse into daydreaming if the former alternative is not possible. [Highfield, 1951; my italics]

The prescription above represents a dead end. It would exhaust children already under strain and suffering from fatigue.

What is the effect of drill? It is an outstanding factor in learning theory. Two Americans have given some indication of its effects on arithmetic. First Swenson (1949) has shown that children who were taught by a method that stressed the organisation of the number facts around generalisations forgot less than children who had been merely drilled. She concluded that the text-books with series of graded mechanical exercises favoured in remedial classes were not the best. Anderson (1949) in another test of generalisation versus drill instruction obtained results that are most important for remedial work. Pupils who are not working up to their abilities need explanation, not exercise. They require attention to meanings, relations and understandings, not flash card drill. Understanding should be established and then the practice should come. That is why Irving *et al.* (1957) have found in Exeter that 'improvement in reading ability is more likely to follow upon the solution of a child's personal problems and upon a real expansion of his vocabulary than upon mechanical remedial teaching'.

The children in the research sample were given concentrated doses of what they had apparently missed in school. But this telescoped re-teaching was not effective. Slow learning children are slow growers, who need time to move and time to find things out for themselves.

C. TEACHER-CHILD RELATIONSHIPS

Redmount (1948) noted that 'teacher maladjustment was definitely associated with adverse or indifferent results for the children in both reading ability and personality change'. The teachers and tutors co-operating in the Birmingham research no doubt had their general personality differences, good and bad days, but the investigator's impression was that they were indistinguishable as groups in their attitudes to children. They expected the children to improve in attainment, be reasonably obedient and to fit into the school class or remedial group. As individuals they showed patience and were willing to make allowances for emotional outbursts but the situation in which they worked kept them *teachers* rather than psychotherapists. There were strong tendencies to censure and attention was focused on the attainments rather than the total growth of the children. Schrupp's and Clayton's (1953) conclusions appear relevant:

> It is likely that teachers' attitudes will never approximate very closely to the ideal criterion attitudes as established by clinicians (psychologists and psychiatrists), since good teachers will always need to be concerned about temporary but disturbing behaviour in the classroom.

Remedial work claims to be partly therapeutic, but the tutors' case notes showed that there was considerable restriction.

> M.L., aged 10 years, I.Q. 108, was backward in reading and spelling. Her behaviour suggested insecurity so therapy was given. During the sessions she first came too early. She was checked for this. Then she arrived on time, then late, and finally early again.
>
> When she was noisy M.L. was told to talk in 'whispers'. She did this 'with great exaggeration'. She was asked to write when she wanted to paint. When she continued painting her tutor commented: 'I told her that she was a naughty girl and said that I was cross with her.' M.L.'s behaviour continued to be immature and disruptive so her tutor reasoned with her. The girl 'very sensibly admitted her naughtiness and said that she would try to behave'. Her lack of concentration and difficult behaviour continued. Her tutor's final entry read: 'Behaviour towards the boys much the same. No interest in reading and wishing to improve. Probably no real incentive from her environment. Dressing the dolls (i.e. the therapeutic play at that time) has become a *task* and not a pleasure.'

This summary shows that an immature girl from a poor home with restrictive parents and recurrent styes, was handled by methods bound to reduce spontaneity and reinforce unconscious guilt. There was little improvement. The restraining force appears to have been an adult prejudice against a child's self-expression. The tragedy of 'half-education' is that the teacher is forced to play an authoritarian role, and identification with that role blinds him to its inhibitory influences. The strength of prejudice, the persistent sequela of maladjustment, and the intractibility of neurotic illness should make it clear that attitudes are difficult to alter. Recently Henderson (1955) undertook to find out whether teachers profit from self-directed study. Six experimental schools took part. The results were slight. There were few changes in teachers' attitudes towards child behaviour, in teachers' understanding of the principles of child growth and development or in classroom procedures. It would be difficult for teachers to become therapists without thorough training. Therapy is more than kindly teaching, playrooms and apparatus. It is a discipline in its own right. Bettelheim (1950) has made the desirable conditions clear. It is not what the adult does but the atmosphere which he creates that matters. The child will respond according to how *he* senses that atmosphere. He will not be made better by a dutiful adult using therapeutic material according to the book. The child will sense and reciprocate the unconscious attitudes of that adult to that therapy. Adults need to resolve their own tensions before they can establish an adequate psychotherapeutic situation for the resolution of tensions in children. Otherwise they will set up conflicts in the child. This is probably all that amateur therapy achieves. The child will sense what the adult does not realise himself. He will sense that the adult is a sham, conducting a masquerade: acting and speaking one way but feeling another. No useful outcome can grow from play therapy that is only play-acting. The tutors' diaries show that their attitudes in the therapeutic situation were sometimes in conflict with the children's emotional adjustment.

1. *The unconscious reaction of the child to adult attitudes*

One boy aged 9 years 2 months, I.Q. 97, of average physique but with a history of poor health, and from a most unsatisfactory home, was immature and difficult in behaviour. He did not settle well at the Remedial Centre. 'During the early sessions,' said his tutor, 'he did not want to do anything: whined about everything suggested yet had few ideas of what he wanted to do.' He became more at ease after some weeks, but even then 'he still appeared to be testing the reactions of the adults at the Centre'.

One day he painted a ship at sea with ominous black clouds overhead. He refused to place this on the wall with other children's drawings and it was extremely difficult to get him to settle down to learning words.

He was very badly behaved at the end of the session. His tutor said, 'He recognised his own rude behaviour at the end of the session by saying, "I pull rude faces to be funny. I'm not rude. I'm being funny." ' He volunteered this although no reference had been made to his action.

The boy's statement and his behaviour was provoked by the tutor's manner. The child reacted intuitively to the attitudes of the adult.

2. *Tensions are not automatically released by messy play*

A girl aged 9 years 4 months with an I.Q. of 98 was average in physique but emotionally constricted. Home circumstances were good materially but there was little cultural stimulation and parental attitudes were restrictive. Her mother was tense. The girl enjoyed coming to the Centre but was always lacking in spontaneity.

Therapy commenced with clay, sand and water play and painting. She first made a clay family and was content to copy the ideas of others and reluctant to try out her own. The tutor noted that she 'showed at first a typically repressed child's attitude to clay, saying "I don't want to touch it: it's dirty." ' It was later believed that she entered into the spirit of it when encouraged by the adult. She seemed to be losing interest in her work and play after the first term. She abandoned the messy play to tidy up the Wendy House 'with the appearance of great business'. She lost interest in making complete drawings. She said, 'I am fed up with reading because mummy makes me read every night and we are always doing it at school.'

The final comment by the tutor stated: 'After the first few sessions the child's favourite activity in the playroom was always to be tidying up the Wendy House: in part a reflection of her home environment. Her reaction to messy paint and clay work was what one might expect from a child from a "neat" home. She had a horror of having to put her fingers into dirty finger paint and clay.'

This suggests that the prescription of messy play as a release activity may reinforce old attitudes. The therapy may itself become a restraining force.

3. *The direction of play by an adult with preconceived notions of what is therapeutic*

A boy aged 10 years 2 months, I.Q. 95. Poor health history, discharging ears, low cultural and economic background. The first visit of this child to the Centre was an entry into a new colourful world. He played happily with the other children and enjoyed the freedom.

In his early period he chose sand and water play in the therapy room: for a short time also he tried to make pictures with cut-out felt, but produced nothing. A few sessions later he did not want to settle to anything. He interfered with the work of others. His tutor then gave him a constructional toy and he settled down for about two minutes, dismantling it. He then wandered off. The tutor then asked if there was anything that he wanted to do. He asked to paint. It was suggested that he should paint a table-cloth as one of the girls had asked for one for the Wendy House. He then painted about a dozen scattered flowers on paper. After the painting was finished, the tutor told him that he could do anything that he liked in the playroom, but limited this by suggesting that he might like to build something. The tutor commented: 'He has not built anything since he has been to the Centre. His play has been concerned with sand and water. He plays with scales and measures sand. I suggested that he should build a car or a ship, but he did not settle.'

Later the tutor commented: 'I feel it is important that he should construct something. To have a goal in view and work towards the completion of that goal He is deprived of the normal experience with materials at home and I am hoping that the handling of play material, toys, constructive material will help him to settle to passive activities like reading and arithmetic.'

The restraining force in this case would appear to be the deliberate limitation of the child's attitudes and play by the tutor.

4. *Teachers' attitudes may affect behaviour*

A boy aged 10 years 3 months, I.Q. 92, average economic background, good physique, constricted personality. This boy always arrived early and was glad to come to the Centre but did not settle to work. He liked to play outdoors, e.g. 'he laid a train across the lawn with another boy'. 'He climbed a tree and a ladder and joined the others in chasing around the pond, climbing banks and playing cowboys.' Indoors he continued copying drawings until his tutor said, 'At last he has tried to do a painting without copying the drawing out of a book.' In the following session the tutor commented: 'When will he get tired of just copying drawings?' The tutor next attempted to modify the boy's behaviour by a special assignment of work. 'The boy was given a sheet showing the work to be done. When he read it and found that copy-drawing was not included he just sat and sulked. This he did for the whole afternoon.'

According to the tutor this boy 'came to the Centre with a very strong idea of what he was going to do'. The diary suggests that the failure to allow this drive of the child to resolve itself in chosen activities increased the restraining forces affecting attainment. The wish of the tutor to improve flexibility may have reinforced the original constriction.

5. *The stress caused by working in an expectant environment*

A boy aged 10 years 2 months, I.Q. 117. Home background fair, but restrictive. Infancy delicate and after the medical examination he was referred to the orthopaedic clinic because of torticollis. The boy was very apprehensive at the beginning of treatment. The tutor noted that 'his handwriting was poor. A very stiff, clumsy writer.' 'Interested in work but does not give whole attention to it, so makes mistakes, for instance, when reading words containing "p's" and "b's" he made many mistakes until I reproved him. He then made some effort to read correctly.'

It was later observed that 'he is interested in his work but easily distracted. Careless. Responds to praise. There are indications of mischievousness (a good sign) but this is tentative. He must have been suppressed. When he finished his milk he crawled on the floor like a child beginning to crawl, and kept saying, "Look at me! Look at me!"' It was stated after another session that 'he was disobedient about going into the playroom. Played football in the corridor. Continued to do so even when I reminded him that there would be no time for water play for which he had expressed a desire earlier. Gave up playing after about ten minutes. Put the ball away and went back to the tutoring room. Crawled on the floor later in the afternoon.'

Of yet another session: 'Disobedient again. Stayed playing football with the other boys after I had asked him to go in and start work. When he eventually came back to the work room he looked very shamefaced, almost hanging his head.' The tutor was struck by his misery for he commented: 'I didn't say any of the things I wanted to say.' He added the observation that 'disobedience may show the development of confidence but it is a nuisance from the point of view of remedial teaching. The child needs drill in phonics and there is so little time left for it.'

This case tends to suggest that the expectancy of the environment—the stress upon results—may act as a restraining force by blinding the tutor to the developmental immaturity associated with retardation. It may also lead to an imperfect relationship between the child and the teacher, for the latter is unable to accept the child as given but must 'prepare him for the future'. 'There is so much to do, and so little time. . . .'

6. *Belief by the teacher in rational argument and coercion*

A boy aged 9 years 11 months, I.Q. 110. Very poor emotional atmosphere in the home. The boy was considered to be insecure. He had a poor health history and was also below average in physique. The immediate approach of the tutor was to stage an interview.

'This boy's personality problems indicate a need for continued therapeutic treatment aimed at the reduction of maladjustment and not at scholastic achievement. Unfortunately the time limitations complicate the treatment programme. It has been decided that remedial teaching in reading should begin immediately. For this to be effective the boy's entire co-operation will be needed. I discussed this matter with him in a formal interview to-day. The aims of the interview were that:

(*a*) the boy should acknowledge his weakness in reading and his need for improved reading ability.
(*b*) he should see that his work would require more effort on his part.
(*c*) he should have confidence that he could be taught, and that he would make rapid progress.'

The reactions of the boy as described by the tutor were as follows: 'At first he was inhibited and pretended not to be interested. Under pressure he talked and admitted his failure in reading. He became more open and talkative after this confession. He showed anxiety about meningitis and brain injury, past failure indicating future failure: the failure of some teachers indicating the failure of all: that even it if were possible learning to read would take at least five years. Lastly that his mother should not hear of any future failures.' At the end of this interview the boy agreed to 'co-operate, to work at his best for one hour each afternoon that he came to the Centre'. 'He agreed that anything other than his best effort would not be worth while.'

This boy's mechanical reading age was 7 years 3 months at the time of entry and 7 years 9 months, 34 sessions later. It would appear that a 'pep-talk' cannot circumvent growth.

In correspondence, the Secretary to the Association of Workers with Maladjusted Children suggested that one of the characteristics that should be avoided was 'a didactic approach, such as that inevitably acquired after many years of teaching in ordinary schools. The qualities required for work with maladjusted children are not those which make for success in ordinary educational work.' It would appear that attitudes inimical to therapy existed even in the highly selected group of tutors who had studied at the Institute of Education. The presence of these attitudes led, no doubt, to the identity of the emotional atmosphere in the schools and in the remedial sessions. The basic personality structures of the children, therefore, would not improve. The play sessions were not new positive forces. The therapy was an overlapping situation without essential change from the dogmatism and formalism of the ordinary school.

CHAPTER 10

THE CONCEPT OF RETARDATION

A. BACKWARDNESS AND RETARDATION

BACKWARDNESS and retardation have come into use as euphemisms for educational subnormality and mental defect as the range of individual differences has been disclosed by the use of objective tests. The terms apply rather narrowly to failure in English language and arithmetic because of the important place of these subjects in school work. Lovell and Smith (1953) have said:

> It is interesting to note that 'backward' is a term used only in connexion with basic subjects. We do not speak of a child as 'backward' in some of the other subjects of the curriculum but use such words as untidy, clumsy, inartistic and so on. Probably this is because backwardness in some of these other subjects is not as serious a matter for the purposes of living as backwardness in the basic subjects.

The terms are thus linked with the moralising and utilitarian attitudes to education that prevailed in the old 'elementary' schools that gave the lower classes the key to literacy. Tradition has led to the veneration of attainment and an aftermath of tradition has been the tendency to pass judgment on deviant boys and girls rather than to accept the inevitability of individual differences. Hence Kemp (1957) has misinterpreted the implications of his finding that attainments in orthodox schools are more homogeneous than in 'the freer and more progressive kind of school'. Instead of sensing that the schools where the chief goal of instruction is the mastery of the three R's merely mould children by working against the known tendency of education to increase individual differences Kemp blames the freer teaching, saying: 'High variability probably means that teachers are encouraging the brighter children to forge ahead and are neglecting the duller ones.' Yet Anderson *et al.* had shown in 1956 that systematic teaching artificially reduces individual variations while informal methods allow maximum individual differences. It will take time for such opinions to penetrate an education system in which *laziness* is used as an explanatory concept although paediatricians have affirmed 'that the retarded child is not just lazy, and that he cannot be forced to learn' (Illingsworth, 1955).

It is unfortunately true that mankind in the mass is intolerant of deviations, hence the concept of mental *disorder*. The history of psychiatry shows that deviants have been treated with 'consistent cruelty, scorn and malevolence'. Variations from the average are objects of curiosity and slow learners become doubly conspicuous in schools because of the disorder they cause. 'They are the children who are left back, impede progress, and upset the timetable,' wrote MacLaren in 1928. Adult prejudices are aroused by children who fail to reach some mythical average—prejudices which children sense rapidly, for when Hollis (1935) investigated the relative popularity of various qualities in teachers one lad commented:

> Patience is essential, for in the best form there is always a worst boy: and a master who confines his interest to his best boys often leaves undiscovered good qualities in boys who are slower in their grasp of the subject.

One child included in the research sample said:

> Mother says I am backward in reading and arithmetic because I went to a nursery school where we only played, and the deep sleep we had when we were tired out made us into lazy children who cannot learn.

Parents, teachers and the general public still tend to view slow learning with strong disfavour because the maturation or development and the rhythms of growth of children and adolescents are not yet understood.

It would appear that the ideas expressed by the word *retardation* are linked with superstitions about the nurture of children rather than with a scientific attitude. The terms *backwardness* and *retardation* must be viewed as pre-scientific to-day. The aim should be to replace these terms by neutral explanatory concepts. Writing on this topic Brimer (1957) has said: 'Perhaps, however, the main practical point that we have tried to make clear is that the notions of backwardness and retardation might be replaced by a differentiated concept of readiness.' Such an approach would reveal that variations are inevitable because children are different.

B. RETARDATION AS A STATISTICAL CONSTRUCT

Considerable attention has been paid by educational psychologists to the relationships between scores on tests of intelligence and attainment. Some children are said to do as well as can be *expected* of their level of intelligence and some do not. A retarded child is one who fails to achieve scholastically what is expected on the basis of his intellectual capacity. He has a negative discrepancy between mental test score and the score on an attainment test, and this discrepancy is regarded as objective evidence of remediable retardation. Failure to achieve at the level of attainment suggested by intellectual capacity is thus an indication that some improvement can reasonably be expected from remedial work.

In the diagnosis of retardation in individual children it has been a general practice to select cases for remedial help when attainment is markedly below intelligence, so that the statistical concept of retardation has been underpinned by the assumption that children should work at their mental ages. In Britain Hume (1926), Wheeler (1927), Carey (1928), Maclean (1937), Barrow (1938), Adams (1940), Schonell (1942), Metcalfe (1950), H. B. Valentine (1951) and Birch (1951) identified the under-achieving children by discrepancies of one year to 18 months of test ages. Yet the faults of this method were pointed out during the 1920's and 1930's in the United States in journal articles. McLaren (1949) has made a systematic summary of this literature. There are several objections. Firstly, McLaren noted the technical problem of the relation of the intelligence tests to attainment tests. Intelligence tests do not unequivocally measure 'innate general cognitive ability', but are themselves achievement tests, so when attainment and intelligence scores are compared and mental age is accepted as a standard by which output should be judged one is using a test as a control which includes the factor that we are attempting to measure. Secondly, scholastic success cannot be predicted precisely by intelligence. The correlation of intelligence with tests of reading, spelling and arithmetic is considerably less than unity so it is not the sole factor in achievement. Thirdly McLaren pointed out that the retardation of a proportion of pupils is statistical rather than educational because the standard deviation of educational quotients is smaller than that of intelligence quotients and since the correlation between I.Q. and A.Q. is persistently negative the bright will appear to be retarded and the dull to be accelerated. Regression to the mean also enters into computational errors. An example of errors of this kind is provided by the report of the educational psychologist for Belfast in 1953 (*Times Ed. Supp.*), who attributed retardation in bright pupils to large classes, and its absence in the dull to good teaching.

His deduction was false because the inevitable tendency—due to regression—for more high-I.Q. than low-I.Q. children to appear retarded was ignored. Finally the achievement quotient is not a highly reliable measure. McLaren quotes one investigator, Popenoe, who experimented with 600 pupils from 9 to 14 years of age. Tests of intelligence, reading, spelling and arithmetic were given and repeated in parallel forms. The correlation between A.Q.^{1} and A.Q.^{2} was +0·28, much lower than the reliability of any educational measure that should be retained in use. P. E. Vernon (1958*b*) has recently published similar arguments against the A.Q., which, in his opinion, 'should be banished by British psychologists'.

McLaren's thesis had not been published so there was some surprise when the defects inherent in the discrepancy approach were demonstrated recently by Pidgeon, Yates and Brimer (1956, 1957). These research workers showed that achievement ratios are symmetrically distributed, a confirmation of the material obtained by the present investigator from Smethwick (see p. 48). This symmetry of distribution makes it obvious that 'the notion that a score on an intelligence test provides an indication of a child's innate intellectual capacity, and, therefore, sets a limit to the level of attainment that he can be expected to reach is untenable'. Vernon (1958*a*) has stated that psychologists are somewhat to blame for allowing over-simplified and over-optimistic views of mental testing to become absorbed by teachers and educationalists generally. The view which has gained ground but which cannot be accepted to-day is summarised by Vernon as follows:

> The I.Q. as measured by standard intelligence tests, applied in a standard manner, measures the child's innate intellectual capacity which is determined by his genes. This general ability or '*g*' is the main factor underlying achievement in any direction, particularly in the educational

sphere. Moreover, since this index of intelligence is very little affected by upbringing or environment, it enables us to predict, even in the junior school, the child's present and ultimate capacity for acquiring school learning and his suitability for a career involving high (or low) intelligence. If he is backward educationally and his I.Q. is low we need no further explanation. But if his I.Q. is superior to his attainment there are probably environmental or temperamental causes, or defects of schooling, which should be 'remedied' so that he can work 'up to capacity'.

In the history of research into backwardness there were dissenters who realised that more was needed than an I.Q. or an A.Q. or a discrepancy between test scores to identify children in need of help. Monroe (1932) attempted to allow for growth factors by computing a 'reading index' to compare 'the child's composite reading grade with his average chronological, mental and arithmetic grade'. The formula was as below:

$$\text{Reading index} = \frac{\text{Reading age}}{(\text{C.A.} + \text{M.A.} + \text{A.A.}) \div 3}$$

Betts (1950) refers to another formula which includes summed mental and chronological ages, arbitrarily weighted:

$$\text{Reading quotient} = \frac{\text{Reading age}}{(2\text{M.A.} + \text{C.A.}) \div 3}$$

Austin (1953) summarised a number of such procedures for identifying readers in need of corrective instruction that have been used in Canada and the United States.

In England Sleight (1932) had also studied the predictive value of the achievement quotient. He looked upon it as unsatisfactory as it did not allow for the correlation of intelligence and attainment tests, or for chronological age. He checked the discrepancy criterion by examining the progress of children in a good school. Initial tests showed that the dull tended to high achievement quotients and thus appeared to be working above their levels of ability while the bright seemed retarded because their A.Q.s were proportionately lower. These bright children were then given extra help (remedial) in an effort to accelerate their progress. Retests one year later indicated that the second achievement quotients were not appreciably better than the first. Sleight then commented that 'the achievement quotient of 100 appeared to be too high an expectation for bright children, and too conservative an estimate for the dull, whereas theoretically it should be attainable by all grades of intelligence'. He then took the correct scientific step and abandoned the basic hypothesis, saying:

> It is the assumption that a general ability can be made the sole determinant of school attainment which invalidates the accomplishment quotient and produces such untenable conclusions.

In Sleight's adjusted A.Q. equation the denominator lay between C.A. and M.A. according to the test correlations. The denominator, for example, would be 9·5 years if 'r' = 0·75 and the M.A. was 10 years and the C.A. 8 years. His formula was a statistical short cut and he recognised that it was impossible to allow for every item that goes to make up a complex physical and mental life.

The combination of the discrepancy between mental age and reading age and case study material was suggested by Schonell (1942) and is the approach typical of present-day practice in this country. The discrepancy in the first instance is usually between a non-verbal test and a group reading test and arrangements should be made to have these scores checked by individual tests when children are seen by a psychologist after the initial screening by group tests. If the discrepancy score is still negative remedial work should be planned on the results of a careful study of all aspects—intellectual, emotional, environmental and scholastic. Thus the discrepancy score is the beginning stage of identification and is followed by clinical impressions guided by many *ad hoc* hypotheses. Young bright children are eliminated as their 'retardation is more relative than real'. Children who are *generally* backward (i.e. in more than one subject) are seen as less likely to respond to remedial help: both general or specific backwardness may be curable or incurable: children's physical condition and health history are taken into account. Additional hypotheses have also been developed to explain 'specific handicaps'. Prominent among these are congenital word blindness, eye-voice span, visual perception, auditory and kinaesthetic sensitivity, cerebral dominance and laterality difficulties, reversals and specific weaknesses of memory. Some of these hypotheses are particularly suspect. MacMeeken (1939, 1942) for example, has stressed the link between developmental aphasia and ocular dominance. She studied difficulties in word recognition, reversal tendencies and failures on the Terman-Merrill memory for designs test and concluded that the key to retardation would lie 'in the intricate realm of matters concerning brain localisation, cerebral dominance, laterality understood in its widest sense'. But this opinion neglects the probability that the tendencies derive from conceptual immaturity, or may be the effects of the too early introduction of symbols to children. The retarded readers in the present investigation did not show any outstanding weaknesses in word perception other than a tendency to omit more words than normal readers of the same reading level. They were very successful in the Terman-Merrill designs test:

TABLE XLI

RESULTS OF TERMAN-MERRILL MEMORY FOR DESIGNS SUB-TEST

	Experimental groups			*Totals*
	I	II	III	
Passes year XI	13	12	11	36
Passes year IX	6	6	7	19
Failures	1	2	2	5
Totals	20	20	20	60

Zangwill (1958) is another investigator who claims that some backward readers show mixed lateral preferences and other signs so the matter must still be investigated, but it is clear that many of the clinical diagnostic 'signs' rest upon dubious assumptions. The *error-types* postulated by Schonell seem to reflect developmental immaturity rather than specific factors. Birch (1951) said that he did not find analytic reading tests of word-attack to be helpful in clinical diagnosis. Kendall (1948) did not find a significant relationship between retardation and visual-motor difficulties. In fact, the division of cases into specific and general types of retardation may also be artificial. The '*v*' and '*n*' factors are isolated more easily by elementary tests according to Vernon (1951):

> It follows that in primary schools children are much more likely to show unevenness or specific backwardness in elementary arithmetic or verbal attainments than they are in problem arithmetic and composition, or other more *g*-saturated subjects.

Thus specific retardation itself is a very doubtful entity. In most cases diagnoses of specific and general retardation reflect little more than the tests used and the tendency of junior school work to be mechanical learning by 'rote'.

The diagnosis of retardation is not scientific and the statistical concept of remediable retardation is not based upon a coherent theory. Vernon (1958*a*) states that British research has not revealed any more scientific means of diagnosis than the teacher's or the clinic's subjective judgment. This is true, for reading research as a whole is extremely superficial. What is required is a coherent theory of child growth and development into which learning to read fits as an aspect of mental development as a whole, from recognition of a rattle to adult thinking and reasoning.

C. CONCLUSION: (*a*) CHILD DEVELOPMENT SHOULD BE STUDIED AND CORRECTIVE INSTRUCTION SHOULD PACE DEVELOPMENT

The terms *backward* and *retarded* have been condemned as prescientific judgments of children made in an educational system that is fundamentally hostile to individual differences, particularly in rates of learning the three R's. They are terms which indicate unwillingness to accept different rates of growth as normal variations between human beings, and should be replaced by some concept of differentiated readiness. It has also been shown that specialists in remedial education define retardation in terms of the discrepancy between mental and attainment ages, or by the achievement quotient. If the A.Q. is low, or the reading age is a year to 18 months below mental age the child is a case for remedial help. But it is now clear that the relationship between intelligence and attainment is not perfect. Not only is the I.Q. less helpful than was previously supposed but the concept of statistical retardation itself, which has governed the selection of cases for remedial treatment in England and Wales, must also be abandoned. As Vernon (1958*a*) has written: 'Research evidence gives very little support for the claim that higher-I.Q. children overcome their "retardation" more rapidly than low-I.Q. children. . . .'

How then should children be chosen for remedial or adjustment classes and what should be the methods of treatment? It appears from the evidence provided by Pidgeon and Yates (1956) and the data in this monograph on attainments and ability in Smethwick (see p. 48) that the ratios of reading and other attainments to intelligence approximate to the normal curve of distribution.

Thus in a representative population of school children approximately 70% will have mental ages and attainment ages that agree fairly closely, but there will be 15% of marked over-achievement and a similar percentage of under-achievement. If the results of a test survey in a school or a district in an education authority were plotted and the distribution was non-symmetrical so that the mean was smaller than the median and the longer tail of the distribution extended towards the left, i.e. *negative skewness*, then it is suggested that the amount of slow learning present would be abnormal. The step in this circumstance would be to consider the possible causes of the E.Q. being less than the I.Q. Vernon has said that this type of discrepancy

> . . . frequently arises because the intelligence test embodies speed, spatial or other group factors in which the child is relatively strong, but which have scarcely any bearing on his educability. Nevertheless, as we know from follow-up studies of the 11 +, a reliable verbal intelligence test does provide somewhat better evidence of future educability than does present attainment, when the circumstances of schooling alter. Thus a proportion of children with E.Q.s much below I.Q.s probably does arise from environmental handicaps, emotional maladjustment, lack of interest, irregular schooling and the like.

The staff of a school psychological service faced with the problem of children failing to 'work to capacity' should take three steps: (*a*) liaison with inspectors and organisers, (*b*) co-operation with local health, welfare and other social services, and (*c*) the study of children's records and test scores to isolate the most serious cases whose attainments lag furthest behind their chronological ages but who may improve with help.

The first step should be taken to reduce retardation due to the most obvious cause, bad teaching environments or generally inadequate or inappropriate educational stimulation. More slow learning is due to bad teaching than is generally admitted. Birch (1951) commented of the children in his area:

> It is probable that very few of these children really needed to attend an establishment like ours. They should in the first place, never have been allowed to become as retarded as they were, and, having become retarded, they could, most of them, have been treated by their own teachers in their own classes, or in adjustment classes in their own schools.

The schools should be considered critically and the plans, aims and purposes of teaching approaches studied. The school resources, the accommodation and amenities, the teaching material and equipment, and the strengths and weaknesses of the teachers should be appraised. As Ilg and Ames (1950) state in an interesting paper on the development of children in reading:

> It seems probable that a large amount of the so-called 'reading disability' cases which are so unfortunately prevalent in our schools to-day come not from any actual 'disability' on the part of the children who are failing their reading requirements in school, but rather from the school's attempt to force unready organisms to perform at a level for which they are totally unprepared. The child's attempts to perform at a level which is beyond his abilities naturally leads to failure and confusion.

Inquiry should extend beyond the schools themselves. Is the local authority and its administration helping schools to achieve good results from slow learners? Schools and teachers in this country cannot be blamed for the state of a minority of children. There is a need for more nursery schools, better teacher training and a revolution in the staffing and equipping of infant and junior schools. Many more classes for slow and difficult pupils are essential. There should be adequate follow-up at the secondary stage. Next, the interaction between schools, administration and local neighbourhood influences must be considered and interpreted. How much are poor results in individual schools due to neighbourhood conditions? Birch (1951) said of his cases:

> The child with whom we are most likely to experience failure is the one from a very poor home, where literacy is low and there is an unfavourable attitude towards the Centre and the school. Children of this sort may come in a very apathetic state: for a while the novelty and stimulating material in the Centre provoke interest and there is usually a gain in reading age. Then after a while the old apathy creeps back and we are only able momentarily to regain any interest in learning to acquire an ability for which there is no felt need.

Can such children be helped in their own schools? A study of the effects of socio-economic factors on backwardness was made in Glasgow in 1939 (McLaren, 1949) and attainment was investigated in relation to housing. Retardation increased as poverty increased reaching a figure of 30% in the poorest areas, but in one school an experimental group of children was a significant exception. This school had been the centre for an experiment in which 40 boys and girls took part. Their parents agreed to observe prescribed conditions affecting hours of sleep, regularity of school attendance and attention to minor ailments. The children had special clothing into which they changed on arrival at school: breakfast, dinner and tea were supplied and shower baths were available. The attainments of these children rose. Many children, as the present research has shown, need remedies that are social and medical rather than more classroom work and schools to be truly 'remedial' must move into the field of social service. This is work that is only in its infancy.

Co-operation with local health, welfare and other social service departments follows logically from the discovery that specific reading disability (in the sense that reading ability is low) as in the research sample and Malmquist's (1958) study is never an isolated effect. Even in the welfare state the most difficult task is to find the remedy for helping the child in an unstable home or who lives in a slum where the parents are incapable, even if willing, of running the home satisfactorily. The gap between deprived children and those with normal home life grows as they grow. Work with such homes is urgently needed. Co-operation with other agencies in the broadest sense, from health visitors to child guidance clinics, should reveal the points where local policies may be able to reduce the physical, social and emotional forces leading to slow progress in school. Are local social and medical services active and adequate? How are problem families being helped? There *is* more that the education authorities could do, for the present restriction of nursery schools means that many children form bad learning habits in their homes early in life, and these go uncorrected. It is leaving it too late to tackle the problem when children are in infant schools.

The advice to school psychological services to start with school and neighbourhood conditions first derives from the review of previous research. Conduct and Ward also say that 'research in the past may have been directed too much to the individual and too little to the class. More efficient methods of classroom teaching could considerably improve productivity in reading and probably lessen the number of children who become problems.' Misleading conclusions have been derived from the individual attention paid to failing children in the past. It has obscured the weakness of the mental-attainment age discrepancy as a diagnostic sign and the fallacy of equating I.Q. with capacity. Remedial workers appear to have relied too much on schedules of circumstances affecting children and upon the diagnosis of errors on individual tests. Their attention has been attracted to superficial symptoms. Diagnosis in depth has been weak. This is clear for even experienced workers have failed to grasp the true value of case study material. Thus Birch (1951) stated that although the case history was a very considerable document 'it was disappointing to find as many cases as we had when we are still very uncertain of the actual cause or causes of a particular child's difficulty'. He looked upon it as a 'clumsy tool for diagnosis'. The point is that neither the diagnostic test nor the case study are discerning in themselves. Interpretation depends upon the orientation of the investigator. Educational psychologists and teachers will need to study child development if they are to gain from the study of individual children. The reading problems in this research indicate that differentiation and maturation are the keys to problems of learning. Until now the achievement quotient has been the major short cut to assessing relationships between abilities and attainments but it is untenable and should be discarded. Yet measurement cannot be discarded. Clinical impressions are inexact. Olson (Harris, 1957) describes a method used at the University of Michigan. Many measurements of growth are made, for example, 'growth in height (H.A., height age), weight (W.A., weight age), bone (C.A., carpal age), strength (G.A., grip age), dentition (D.A., dental age), intelligence (M.A., mental age) and achievement (R.A., reading age)'. An average is taken which is called the organismic age (O.A.). Attempts are being made to predict potential from this and other measurements and the organismic quotient (O.A./C.A. × 100) is used to determine theoretical attainment levels. The method has the advantage of objectivity over mere clinical impressions for predictions can be checked by re-tests and longitudinal studies. For example, Ames (1957) has reported one study of physical maturing among boys as related to adult social behaviour in which physical maturation rate was shown to be significantly related to occupational status and other variables whereas, 'at the 1% level, none of the ratings of social behaviour during adolescence could be considered to be significantly related to any of the measures of (adult) social behaviour'. On the basis of his work Olson has formulated the hypothesis: 'For all achievements which increase with chronological age, the rapidly growing child will yield the achievement earlier, and the slowly growing child will achieve the status later than the average child of a given age.' This hypothesis may orient further research into the needs of slow and uneven developers. Some of the measurements are difficult to obtain but a start can be made. For example, the following psychological report illustrates the approach to slow learning in Cornwall:

> Alan X., C.A. 6 years 2 months. From the point of view of the psychologist Alan presents a picture of uneven growth, that is, he is clearly below average height and weight for age, and from the X-ray mentioned by the paediatrician the bone age is also retarded. Speech is immature—he has not, for example, mastered the hard 'g' sound.
>
> The picture given by tests can be combined with factors in the social history to give an overall picture of the growth pattern.

Physique	3 + years
Speech development and vocabulary	3-4 years
Bone age	2½-3 years
Social age (Vineland quotient, 59)	3⅔ years
Mental age (Terman-Merrill I.Q., 90)	5⅔ years
Performance age (Porteus maze)	6 years
Attainments—Drawing age	5 years
Reading age	—
Number age	—

> From the educational point of view the average of these ages suggests that Alan has the capabilities of a 4-year-old. He should be treated accordingly at school and given pre-reading and pre-number activities and the opportunity to play with things and to talk about them.

The principles of growth may be expressed as follows: (*a*) Every child is different. (*b*) A child is sometimes more variable in his response than at other times. (*c*) Each child differs in the time at which he is ready to do certain tasks. We should not think in terms of backwardness or retardation but in terms of readiness. (*d*) Children differ in their rates of improvement once responses have been made. (*e*) Every child progresses towards his own maximum. (*f*) Each child's growth fulfils a specific relationship between heredity and environment. (*g*) It is more difficult to change the growth of older children. This broadly is the psychology of development that could take the place of subjective clinical impressions and the misleading achievement quotient in the study of the slow learning child.

D. CONCLUSION: (*b*) METHODS OF TREATMENT

The study of previous research and the results of the experiment lead the investigator to recommend a learning situation in which vocabulary knowledge and the use of spoken and written language grow simultaneously from creative work and practical activities. The approach could be applied in an area adjustment class for 20 children of junior school age.

Reading is pleasantly introduced through the compact *Adventure in Reading Series* (O.U.P.). The method is based on sentences but can be developed phonetically while the grading and the interest value of the content is suited to the age at which slow learners begin reading. Some immature children may be interested more by infant books. *The Happy Venture Series* (Oliver and Boyd), *Gayway* (Macmillan) and the *Pilot Readers* (Arnold) blend together usefully because they bring the child into contact with sentence, phonic and word approaches linked with simple dictionaries. The *Royal Road Readers* (Chatto and Windus) facilitate phonic instruction. In addition, there should be a library corner with a suitable selection of story books in attractive dust covers and books on nature study, geography, history, religious stories and to stimulate general observation. Books like the *Lets Make Something Series* (Arnold) attract children if they are well displayed. They are not always read, but the pictures are good and the practical work may be carried out independently.

Very few reading aids and games are really necessary. The games may be too much like ones at home. The children do not apply themselves for any length of time so they are not beneficial for learning. Their value compares badly with their cost. The room itself should stimulate reading interests by displays of pictures, books and posters. Desks and equipment should be arranged so that there is a reading corner, a sum corner for quiet work, an art and craft space and a workspace for woodwork and clay and paper crafts. There should also be large items like a puppet theatre, a sand tray, etc. Ample quantities of brushes, clay, paper, paint and crayons should be supplied and in a productive class these items will be continually demanded.

The time-table should be a flexible blend of quiet desk work and activities in and out of the classroom.

TIME-TABLE

9 a.m.	12 n.	1.30 p.m.	4 p.m.
Monday 1. Hall assembly 2. Number 3. Activities (Centres of I) 4. P.E. 5. Milk	Quiet work Reading Writing Number	1. History 2. Creative activities Garden Woodwork Needlework	Dramatic activity
Tuesday 1. Classroom prayers. Talk about schemes 2. Number 3. Activity 4. P.E. 5. Milk	Story Singing	Story Mime and dance	Games Individual therapy
Wednesday 1. Hall assembly 2. Number 3. Activity 4. P.E. 5. Milk	Quiet work Reading Writing Number	Walk	Lesson from walk (Nature)
Thursday 1. Classroom prayers. Talk 2. Number 3. Activity 4. P.E. 5. Milk	Quiet work Reading Writing Number	1. Geography 2. Creative activity Garden Woodwork Needlework	Dramatic activity
Friday 1. Hall assembly 2. Chosen activity 3. P.E. 4. Milk	Quiet work	Controlled painting and pattern work	Stories

The teacher working with an adjustment class will find that a few children will be reading but the majority will be borderline or non-readers. The non-reader who comes into this class after two years in the infant school and possibly one year in the junior school will probably have been in contact with daily formal reading lessons from the age of 5½ years. The approach will usually have been mixed—that is, a combination of word, sentence and phonic reading. One or two basic infant reading series may have been used, so the child will have become accustomed to 'holding' a reading book in group reading situations and may have developed 'memory' reading based upon key words and pictures. But he will not register a score on a reading test and may avoid books outside school, even to the extent of ignoring comics. His behaviour may show passivity, distractibility, maladjustment or other evidence of stress or fatigue. He may or may not be able to write from copy, speech may be poor and his conversation may be limited.

A teacher aware of developmental trends in reading (Ilg and Ames, 1950) will note down and study the signs indicating the child's present level. Teachers can learn to do this by familiarising themselves with *The Standard Reading Tests* (Chatto and Windus). The child may know some letters by form, i.e. 'the round ones', or by association (G, for George). There may be knowledge of the alphabet through songs and poems. The child may print some letters spontaneously. He may read a few words, and at this stage errors due to saying words of the same general appearance may take place, or there may be reversals of single letters (b—p), or of whole words (saw—was).

The child in this condition of pre-reading should be allowed free and controlled play with the material available to break his associations with the old classroom routine in which he failed. The teacher's attitude should be positive so that his unconscious impulses to help the child will be therapeutic rather than productive of further anxieties. The teacher should avoid the tendency to administer a confounding array of tests and much less 'teaching' need be done individually than one would think. He should concentrate on making the learning environment a stimulus to social, emotional and intellectual growth so that the stimulus from the room and its atmosphere attracts the child and arouses his interests.

Doing and saying come before writing and reading. Every child in the readiness group will do something practical in the classroom as a stimulus to putting down some written description. There should be accounts of events, of work that the child has done, or walks, nature observations and other activities that are going on around the child all the time. Sentences and stories can be written up in small individual books which each child will illustrate. In some cases word tracing and copy writing assist development of confidence and motor skills. Reading will commence gradually, just as gradually as the development of speech.

Eventually regular work with text-books will have a place in the reading programme. A similar method can now be followed with the child using a plain exercise and taking sentences from the graded readers which he can trace, or copy and illustrate. There will be individual reading and the simplest of comprehension exercises. In this way the child will learn reading rather than be taught to read. The writing, work study and the new medium of words in print will flow from speech development. Spontaneous and plentiful written work can only spring from much oral work in an acting, talking and listening environment. Reading is essentially a growth process and its chief incentives are play with new found skills and the child's pleasure in achievement. In an active adjustment class with a favourable atmosphere many backward children would learn given time and patient handling. Certainly heredity tends to promote variability in individual achievement, but genetic influences cannot be separated from an environment, and if the environment of the school ignores or fights against those genetic influences children are bound to become less creative, and bound to fail.

CHAPTER 11

POSTSCRIPT: SOME RECENT INVESTIGATIONS

NEW evidence has been published in Britain since this monograph was written. Kellmer-Pringle and Sutcliffe (1960) have described two years' work by a remedial unit for maladjusted and deprived children at the Caldecott community. Help was given to 15 cases of reading retardation and 13 cases of arithmetic backwardness. The children selected were of junior school age, of at least average intelligence, and the 'main criterion' of retardation was the discrepancy between mental and attainment ages.[1] Responses to treatment were measured by Schonell tests while subjective assessments were made of improvements in behaviour. There was no control group, no experimental design, and only limited follow-up of cases. The effectiveness of the remedial work was illustrated by the comparison of the gains made during treatment with the estimated progress made by the same children before treatment. This cannot take practice effects, special coaching effects and regression phenomena into account. The rationale for this method of estimating gains is provided by the hypothesis that 'Pupils of normal intelligence who have no learning difficulties make one month's educational progress during each calendar month. Backward children fail to do so and remedial treatment aims at bringing about an acceleration in their rate of learning'. This is highly debatable for the researches reported by Millard (1958) in the United States and investigations made by Tanner (1960) in this country strongly suggest that individual growth rates vary tremendously so that individual growth velocity curves make nonsense of averages computed from cross-sectional studies.

Complete results are available for about half the children and they are set out in summary form below to show the changes in attainment scores during the period.

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[1] Yet Pidgeon and Yates (1957) have warned against the idea that a score on an intelligence test provides an indication of a child's inmost intellectual capacity and therefore sets a limit to the level of attainment.

TEST RESULTS FOR MECHANICAL READING (NO. OF CHILDREN: 8)

Item	*Data at start of treatment*	*Data at end of treatment*	*Follow-up data*
I.Q.	106	106	106
C.A.	10–2	11–3	12–0
M.A.	10–8	11–11	12–9
Mechanical Rdg	6–4	8–8	9–8
Average RA/MA Discrepancy	4–4	3–3	3–1

TEST RESULTS FOR MECHANICAL ARITHMETIC (NO. OF CHILDREN: 8)

I.Q.	121	121	121
C.A.	10–7	11–5	12–6
M.A.	12–10	13–10	15–2
Mechanical Arith.	8–7	10–6	10–10
Average AA/MA Discrepancy	4–3	3–4	4–4

These figures are compiled from the tables presented by the investigators.

It will be seen that the remedial arithmetic has produced no effect. This may be because practice effects are slight on this test (Curr and Gourlay, 1960). Improvement in mechanical reading is very slight and it is impossible to separate 'true' gains from the effects of maturation, practice on the tests or coaching. It would appear, however, that the reduction in apparent retardation has not justified the expensive nature of the treatment. Improvements in behaviour and attitudes are claimed but the estimates are subjective and they vary with the subject groups (i.e. more readers are said to have improved than the arithmetic cases). This strongly suggests that the teachers' estimates were biased by the 'halo' effect that bedevils ratings; the children whose apparent attainments improved most were deemed better in behaviour.

Other articles on the effects of remedial education have appeared in a recent Symposium—'Contributions to the Diagnosis and Remedial Treatment of Reading Difficulties'. Hillman and Snowdon (1960) report the results of a scheme for remedial reading established in Durham. In this experiment a simple design is used and two matched groups are compared. The control group was made up of 25 children who spent at least two terms in ordinary junior schools without attending for remedial sessions while an experimental group received treatment twice weekly throughout the same period. Reference to Lindquist's (1940) chapter on 'The Importance of Design in Educational Experiments' indicates the very low precision of the design. Professor M. D. Vernon in an article in the same Symposium (Vernon, 1960) points to the urgent need for detailed experimental studies to unravel the conditions affecting educational progress. The results obtained by Hillman and Snowdon are as follows:

COMPARISON WITH CONTROL GROUP

Matched Groups (25 children)	*Average age*	*Average retardation*	*Average improvement after two terms*
Group A (in own schools)	9–6	3 years	4 months
Group B (in adjustment Classes)	9–7	3 years	1 yr. 11 mths.

This difference was significant but as a further check 21 children were used as their own controls. Their average improvement in reading ability without adjustment class help was 5 months, but after two terms in adjustment groups they gained 1 year 10 months, a result comparable with that obtained by Group B above.

Again the effects of remedial education are not proven in this experiment because one does not know the general adequacy of educational stimulation in the contributory schools and how this affected children before treatment. The apparent magnitude of the gains after treatment by 'qualified part-time teachers, principally married-women, with infant or junior school experience but otherwise with *no special training in remedial methods*' (my italics) strongly suggests as Birch (1951) said of cases who attended his remedial centre, 'The majority of the children should in the first place never have been allowed to become as retarded as they were, and having become retarded they could have, most of them, been treated by their own teachers in their own classes, or in adjustment classes in their own schools.' Nor can one estimate practice effects which must have been maximal in this experiment, for 'all teachers adopted a consistently phonic approach' and the Burt Graded

Word Test was chosen as the testing instrument because 'it appeared to be more closely related to the growth of phonic knowledge than any other test on the market. . .'. The experiment, therefore, adds nothing to our knowledge of remedial work.

Dunham (1960) in the same Symposium reports an experiment of similar elementary design. A remedial group of 20 severely retarded 9-year-old children of average intelligence took part in remedial reading lessons once or twice weekly for 6 months and were paired (a procedure of considerably lower rigour than random matching) with a control group according to age, intelligence, reading ability, and socio-economic area of the school. The remedial children worked in small groups of not more than six as part of the normal work of the Manchester Remedial Education Service. Reading levels were again measured on the Burt test. The results are as follows:

COMPARISON WITH CONTROL GROUP

Matched groups (20 children)	*Average age*	*Average reading age*	*Average gain*
Group A (Tutored)	9–5	5–9	11 mths.
Group B (In the Schools)	9–5	6–6	4·6 mths.

The 'real' gain of 6·4 months was significant at the 1 per cent level of confidence. But the average reading age of the control group was 9 months ahead of the experimental group at the beginning of the experiment. This throws doubt upon the use of paired controls in this research. It could have introduced unknown errors. Thus the control group although of the same mean age and I.Q. (99) as the treated children was already 9 months ahead of the treated group at the start of the experiment and by the end of treatment it was still the better group in the reading tests (Group A, reading age, 6 years, 8 months; Group B, reading age, 6 years, 11 months). Perhaps this experiment has sampled practice effects and variable growth spurts. It fails to add new information upon remedial education unless the finding from a modified Thurstone Rating Scale that the 'real' improvement in attitude to reading was not significantly higher in the treated group can be accepted as an indication that even in this sphere (where previously subjective estimates have been paramount and positive) remedial education achieves nothing.

Another article in the Remedial Education Symposium, by Curr and Gourlay (1960) stresses the impermanence of gains in remedial education experiments and the importance of taking large practice effects into consideration when discussing the application and re-application of attainment tests. The gains claimed in experiments would appear to be little more than the results of practice effects and general maturation.

Thus research since 1956 has done nothing to justify remedial education as an ancillary service. Design of experiments has not advanced since Schonell's pioneer work, reported in Backwardness in the Basic Subjects. It is the author's belief that any attempt to disguise the paucity and superficiality of the great majority of the studies in remedial education is a disservice to the needs of handicapped children in particular, and to the prestige of educational research in general. Local education authorities would be well advised to reconsider their own remedial schemes in the light of Birch's comment (above). The remedial schemes may be mere patches over defects in the overcrowded Infant and Junior schools in a system which employs 36,000 unqualified teachers. It may be well to ask whether remedial education is another quasi-psychological fad based upon unsound knowledge of the brain, of the memory and of learning (see Russell, 1958).

Each Local Education Authority should look closely into backwardness and retardation by school and area to consider the many local conditions under which slow learning persists, and attempt to combat it, not by withdrawing children to yet another agency, but by appropriate use of convenient record card systems, a policy of 'continuous assessment' (see Cheshire, 1957, 1958), and by determined efforts to improve the quality of the educational provision as a whole.

APPENDIX

TABLE I

SUMMARY OF AVERAGE SCORES MADE BY BOYS AND GIRLS IN THE RESEARCH SAMPLE TREATMENT GROUPS IN THE MAJOR TESTS

	I		II		III	
	B	G	B	G	B	G
C.A. (Oct. 51)	9; 9·2	9; 5·9	9; 9·6	9; 8·1	9; 9·9	9; 7·8
Intelligence						
T.M.L. I.Q.	97·3	95·6	99·5	96·9	102·5	93·9
WISC I.Q. 1	99·1	96·6	99·9	94·3	101·5	96·3
WISC I.Q. 2	102·8	99·0	103·0	98·2	104·7	97·2
Social maturity						
Vineland						
S.A. 1	9; 1·6	8; 9·9	8; 10·4	8; 9·1	8; 10·5	9; 1·1
S.A. 2	10; 0·7	10; 0·1	9; 10·7	9; 11·1	9; 8·0	10; 2·3
Reading mechanical						
Burt R.M.T. 1	6; 1·7	6; 10·2	6; 4·6	6; 10·9	6; 4·4	6; 6·5
Schonell						
R.M.T. 2	6; 4·6	6; 11·2	6; 9·3	7; 0·6	6; 5·9	6; 9·8
R.M.T. 3	7; 6·0	8; 4·1	8; 0·5	8; 6·3	7; 3·1	7; 5·2
R.M.T. 4	7; 11·3	8; 5·6	8; 0·0	8; 6·5	7; 4·9	7; 7·7
R.M.T. 5	8; 4·6	9; 0·0	8; 7·0	9; 5·2	9; 2·0	8; 5·0
R.M.T. 6	9; 5·7	10; 3·4	9; 11·6	10; 2·0	10; 2·5	9; 7·0
Reading comprehension						
Schonell						
R.C.T. (A) 2	7; 2·9	7; 3·3	7; 4·9	7; 2·0	7; 3·1	7; 2·2
R.C.T. (A) 4	8; 2·6	8; 7·1	8; 4·1	8; 7·4	7; 11·5	7; 11·9
R.C.T. (B) 4	8; 1·8	8; 1·7	8; 1·4	7; 11·8	7; 11·1	7; 8·3
R.C.T. (B) 5	9; 0·6	8; 10·0	8; 10·2	9; 5·8	9; 0·3	8; 7·5
R.C.T. (B) 6	9; 9·6	10; 5·0	10; 9·1	10; 9·5	11; 0·8	9; 10·3

TABLE I (*Contd.*)

	I		II		III	
	B	G	B	G	B	G
C.A. (Oct. 51)	9; 9·2	9; 5·9	9; 9·6	9; 8·1	9; 9·9	9; 7·8
Spelling						
Schonell						
T. (A) 2	6; 3·7	7; 2·7	6; 4·9	7; 2·7	6; 4·2	6; 8·9
T. (A) 3	7; 0·3	7; 8·4	7; 1·7	7; 8·3	6; 8·9	7; 1·4
Mechanical arithmetic						
Schonell						
M.A.T. 2	8; 1·1	7; 11·6	7; 11·7	8; 2·3	7; 11·3	7; 9·3
M.A.T. 3	8; 5·2	8; 4·1	9; 4·3	9; 3·1	8; 3·3	8; 0·1
M.A.T. 4	9; 1·1	8; 7·6	9; 1·5	8; 11·1	8; 7·6	8; 7·0
M.A.T. 5	9; 3·7	8; 11·7	9; 1·4	9; 5·7	8; 9·3	8; 11·0
M.A.T. 6	10; 6·4	10; 0·8	10; 7·4	10; 2·0	10; 9·7	9; 5·3

Table II

ILLUSTRATIVE STATISTICS

Chronological ages, intelligence quotients, selection, initial, final, supplementary and follow-up graded word reading test scores

Group I

BOYS

			Graded Word Reading Tests					
	C.A.	I.Q.	T¹	T²	T³	T⁴	T⁵	T⁶
D.O.	10;3	98	6;6	6;7	7;10	8;4	8;8	10;5
A.H.	10;1	109	6;7	6;1	9;1	9;2	—	—
B.C.	8;7	107	6;11	6;11	8;6	9;0	9;10	10;11
R.S.	10;8	92	7;7	7;10	8;11	9;5	10;3	11;4
L.T.	9;7	86	4;4	5;6	5;8	5;10	—	8;0
F.G.	10;4	100	6;5	6;2	7;2	7;8	7;7	—
A.R.	9;7	89	5;2	5;8	6;7	7;7	6;6	7;8
J.G.	9;0	96	7;2	7;7	8;8	9;2	9;8	11;1
G.M.	10;7	95	5;8	6;0	6;11	7;4	7;9	8;11
E.N.	9;0	101	5;1	5;6	5;8	5;11	6;10	7;7

GIRLS

	C.A.	I.Q.	T¹	T²	T³	T⁴	T⁵	T⁶
A.B.	9;9	98	7;1	7;8	8;5	8;10	—	10;2
L.D.	9;4	97	6;6	6;2	7;8	8;2	—	—
E.G.	8;8	92	6;2	6;5	7;6	7;10	9;2	—
M.F.	9;4	109	7;10	7;5	8;11	8;10	10;0	10;7
L.V.	9;4	103	7;10	8;4	10;2	10;4	—	11;3
B.R.	9;7	99	7;0	7;2	9;0	8;8	9;2	9;11
J.W.	9;11	86	6;8	6;10	8;7	8;8	9;6	10;11
C.G.	9;10	86	6;8	6;5	7;10	7;11	9;2	10;7
E.D.	9;11	87	6;5	6;4	7;4	7;7	7;10	9;1
M.D.	9;3	99	6;4	6;7	8;0	7;10	8;2	9;9

Group II

BOYS

	C.A.	I.Q.	T¹	T²	T³	T⁴	T⁵	T⁶
M.C.	10;5	97	5;4	5;5	7;8	7;8	8;1	8;6
P.W.	9;10	98	7;6	7;10	8;7	8;2	—	—
S.H.	8;9	111	7;5	7;7	8;2	8;2	9;10	10;4
A.H.	10;4	99	4;8	5;1	5;7	6;1	6;6	7;8
P.G.	9;9	100	5;11	5;7	6;11	6;7	—	—
L.S.	10;2	96	5;10	7;0	7;7	8;7	8;3	9;6
G.R.	10;3	98	6;4	7;5	9;1	9;10	9;7	11;6
J.P.	9;7	87	7;0	7;4	8;8	8;4	10;1	11;5
J.K.	10;3	92	7;1	6;10	7;10	7;7	7;9	7;11
E.I.	8;8	117	6;9	7;8	10;4	9;10	—	12;11

TABLE II (*continued*)

Group II

GIRLS

	C.A.	I.Q.	T^1	T^2	T^3	T^4	T^5	T^6
V.P.	9;4	106	7;2	7;7	10;7	10;0	—	—
J.H.	10;4	97	6;11	6;11	8;6	8;8	10;0	10;5
P.S.	8;7	95	6;0	6;2	7;10	7;11	9;7	10;4
T.B.	10;2	81	7;11	7;4	8;8	8;4	—	8;11
E.C.	10;8	89	7;0	6;5	7;4	8;1	10;6	11;6
M.R.	10;9	106	7;5	8;0	8;6	8;6	9;0	9;8
P.N.	10;1	107	7;4	7;7	8;6	9;2	8;10	9;6
P.B.	9;4	89	7;0	7;5	8;8	8;8	9;9	11;0
J.S.	9;1	103	6;5	6;7	8;8	8;2	9;5	—
J.H.	8;5	96	5;11	6;6	8;0	7;11	8;5	10;0

Group III

BOYS

T.T.	10;1	108	7;4	7;6	8;10	9;1	10;8	10;10
W.L.	9;2	115	8;2	8;0	8;10	8;2	11;4	11;7
B.D.	9;3	85	5;8	5;8	6;6	6;5	7;1	—
A.B.	10;3	105	5;2	5;2	5;11	5;8	—	6;11
K.H.	8;6	117	7;0	7;0	7;10	8;2	—	10;5
R.W.	10;6	101	7;4	7;0	8;0	8;5	10;2	11;4
R.P.	10;7	93	8;4	7;11	8;5	9;1	—	9;10
E.F.	10;0	105	5;2	6;0	6;2	6;6	7;4	—
G.E.	10;1	104	5;1	5;2	5;8	6;2	—	10;8
M.M.	9;10	92	4;5	5;6	6;5	6;5	8;5	—

GIRLS

P.T.	10;2	85	6;5	6;11	7;5	7;6	7;10	7;11
G.H.	9;11	86	7;0	7;1	7;10	8;0	8;2	9;6
J.V.	9;4	100	6;4	6;10	7;1	7;5	8;8	9;6
M.T.	10;6	107	7;5	8;1	8;4	8;4	9;11	10;4
C.R.	8;6	106	6;1	6;2	7;4	7;8	—	10;5
P.J.	9;5	102	7;2	7;8	8;4	8;6	8;10	9;10
J.Q.	9;11	79	7;1	6;11	7;7	8;4	9;4	9;11
C.R.	9;0	89	6;0	6;0	6;10	6;11	8;0	9;2
R.W.	10;3	98	6;7	6;6	7;6	7;10	8;6	9;8
E.R.	9;6	87	5;4	6;0	6;1	5;11	6;6	—

(*a*) ERRORS IN PROSE READING

The following is an example of the errors made by a child in attempting the Gates' Reading Diagnostic Tests, page 2

All the words in the text read incorrectly are shown in italics. Where one word has been substituted for the correct word it is shown above the italicised word. Where the error was in the form of a repetition of the words the letter '*R*' is shown above the italicised words. Where the error was an omission the italicised words are in brackets.

Oral Reading (*Form I*)

1

The boy had a dog.

boy's

The *dog's* face was black.

barked

The dog's *body* was brown.

He had no tail at all.

Score: 4 Time: 19″ Errors: 2

2

Once the dog saw a rat.

It was a bad rat.

The dog did not like the rat on his place.

R *this*

So *he ran* the rat into *his* hole.

Score: 4 Time: 19″ Errors: 2

3

gone
After the rat *got* into his hole,
peep
he began to *peek* at the dog.
drive
This *drove* the dog nearly mad.
row
He said: 'I like *raw* meat to eat.
If you do not stop, I will eat you.'
Then he left the rat alone.

Score: 2 Time: 38″ Errors: 4

4

taught
This *talk* only made the rat smile.
He could not stop smiling.
He stuck out his chin and cried:
'You are as dull as a donkey,
still
You are as *silly* as a monkey.
Let me give you a good tip.
You had better find a doctor now,
before it is too late.
Maybe he can do something for your head.'

Score: 3 Time: 57″ Errors: 3

5

flush
These remarks made the dog *furious*. He was so angry he could
couldn't
(*hardly*) *control* himself. He (*growled*) in (*dismay*). He (*gnawed*) at
broken *teapot*
the ground. Then he *barked*: 'I am the *protector* of this (*residence*).
chimney-pot *monster*
I am the *champion* of this (*estate*). I will have no *nonsense* here.
left
If you (*value*) your *life* and (*freedom*) you will (*depart*) at once.'

Score: 0·4 Time: 1′ 51″ Errors: 16

6

The rat, a little frightened and very angry,
sample
(*screamed*) his (*reply*): 'What *sublime* (*conceit*)! What
nothing
(*magnificent boastfulness*)! You have *neither* the
nair *expect*
(*courage*) *nor* the (*intelligence*) to *execute* your (*threat*).
you will
You would (*perish*) (*miserably*) *if your* (*misguided human helpers did not provide you with protection*).
You think you are a (*valiant warrior*) but you are
ready *salva*
really nothing but a weak *slave* of (*humanity*).'

Score: 0 Time: 2′ 13″ Errors: 23
Total credits: 13·4
Reading age: 8; 8

(b) LIST OF PRINCIPAL DISEASES AND DEFECTS

		Cases*
A.	*Respiratory diseases*	
	Whooping cough	18
	Frequent colds	17
	Tonsillitis	11
	Pneumonia	9
	Otorrhoea	6
	Bronchitis	6
B.	*Tuberculosis*	1
	Tuberculosis suspected	1
C.	*Diarrhoea and vomiting* (Gastro-enteritis)	5
D.	*Infectious fevers of childhood*	
	Measles	34
	Chicken-pox	20
	Mumps	5
	German measles	3
	Scarlet fever	1
E.	*Miscellaneous conditions*	
	Dental caries	13
	Vision defective	6
	Prematurity	4
	Nasal obstruction	3
	Poor nutrition	2
	Appendicectomy	2
	Tachycardia	2
	Frontal headaches	2
	Rh carditis	1
	Acute mastoiditis	1
	Conjunctivitis	1
	Gingivitis	1
	Jaundice	1
	Asthma	1
	Congenital paralysis of vocal cord	1
	First degree pes planus	1
	Torticollis and postural scoliosis	1
	Enlargement of submaxillary glands	1
	Anterior poliomyelitis	1

		Cases
F.	*Serious accidents*	
	Eye injury	1
	Concussion	2
G.	*Death of siblings*	
	Malnutrition	1
	Bronchitis	1
	Pneumonia	1
	Meningitis	1
	Mastoiditis	1

* Based upon N.53. Some medical records missing.

(*c*) FACTORS FOUND IN PAST CENTRE CASES (1948-51) AND THE RESEARCH SAMPLE

Category	*Past Centre cases* (% no. 45)	*Research sample* (% no. 60)
Home circumstances		
Illegitimacy	8·9	1·7
Foster home: Adopted	4·4	—
Step-parent	2·2	8·5
One parent absent: Death	4·4	10·2
1939-45 war service	42·2	45·9
Due to vocational or health reasons	22·2	5·1
Parental health		
Emotional strain	34·0	34·0
Poor physical health	26·7	28·9
Parental attitudes		
Weak inadequate parents	39·9	30·6
Over-protective parents	23·3	28·9
Harsh parents	11·1	8·4
Home atmosphere		
Sibling rivalry	26·7	42·5
Friction between parents	42·2	50·0
Violence	6·7	3·4
Drunkenness	15·6	8·5
Delinquency	11·1	—
Misdirection of recreational activities	46·7	37·4
Misdirection or interference by relatives	26·7	8·5
Economic conditions		
Superior dwelling (outer circle area)	26·6	13·6
Average (middle ring)	66·6	71·4
Below (inner ring)	6·7	15·3
Overcrowded homes	19·9	20·4
Occupations		
Lesser professional, administrative and clerical	19·9	5·1
Skilled workers	73·2	83·4
Unskilled	6·7	11·9
Mother in full-time employment	31·1	28·9
Mother in part-time employment	22·2	34·0

(*c*) FACTORS FOUND IN PAST CENTRE CASES (1948-51) AND THE RESEARCH SAMPLE (*continued*)

Category	*Past Centre cases*	*Research sample*
Educational background		
Parental interest shown in Educational progress during contact with centre	68·9	68·0
Discontinuity of schooling due to poor health or migration	53·3	28·9
Unsuitable teaching methods	24·4	12·6
Poor teacher-child relationships	26·7	6·8
Children's personalities		
Position in family:		
Oldest	31·1	25·5
Between	13·3	35·7
Youngest	22·2	27·2
Only	10·2	33·3
General health		
Good or fair	89·8	90·0
Poor	11·2	10·0
Specific defects:		
Vision	13·3	10·0
Hearing (deafness diagnosed)	2·2	1·7
E.N.T. (discharging ears, nasal obstruction, infected tonsils)	26·7	25·0
Bronchitis	8·8	10·0
Asthma	2·2	1·7
Enuresis	4·4	3·3
Other	15·0	13·2
Past history of poor health	51·1	35·0
Mental level		
Dull (I.Q. 75-84)	—	3·3
Low average (I.Q. 85-89)	4·4	21·5
Average (I.Q. 90-109)	62·2	68·3
Good average (I.Q. 110-114)	11·1	1·7
Bright (I.Q. 115-129)	17·8	5·0
Superior (I.Q. 130)	4·4	—
Emotional aspects		
No marked symptoms	24·5	13·2
Stress shown	75·5	86·8
Sthenic emotionality	26·6	20·0
Asthenic emotionality	48·9	66·8

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